Hazardous Air Pollutant Emissions
from Miscellaneous Organic Chemical Manufacturing
and Miscellaneous Coating Manufacturing

BASIS AND PURPOSE DOCUMENT
FOR PROPOSED STANDARDS

Emission Standards Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
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1.0 INTRODUCTION

1.1 BACKGROUND

Section 112 of the Clean Air Act, as amended in 1990, authorizes the U. S. Environmental Protection Agency (EPA) to establish national standards to reduce air emissions from sources that emit one or more hazardous air pollutants (HAP). Section 112(b) lists the HAP to be regulated under such standards, and section 112(c) directs the EPA to use this pollutant list to develop and publish a list of source categories for which national emission standards for hazardous air pollutants (NESHAP) will be developed. The EPA must list all known source categories and subcategories of “major sources” that emit one or more of the listed HAP. Section 112(a) defines a major source as any stationary source or group of stationary sources located within a contiguous area under common control that emits, or has the potential to emit, in aggregate, considering controls, 10 tons per year or more of any one HAP or 25 tons per year or more of any combination of HAP.

The list of source categories was published in the *Federal Register* on July 16, 1992 (57 FR 31576) and includes several organic chemical processes collectively organized in the Miscellaneous Processes Industry Group. As explained in Chapter 2, the processes in this miscellaneous process group form the basis of the source categories addressed by the standards being proposed as the Miscellaneous Organic NESHAP, or “MON.” The source categories include processes listed in other groups as well, notably the Polymers and Resins Industry Group and the Surface Coating Processes Industry Group. Most products included in these source categories are produced by chemical synthesis or formulation manufacturing operations, but the standards are not limited to such operations.

1.2 PURPOSE AND SCOPE OF DOCUMENT

The Basis and Purpose Document provides background information on, and the rationale for, decisions made in the development of the proposed emission limitations and work practice standards for the reduction of HAP emissions from the manufacture of products covered by the MON source categories. This document supplements the preamble for the proposed standards. Memoranda referred to in this document, the Supplementary Information Document (SID), and the project docket contain additional information and more detailed descriptions of certain analyses.

Chapter 2 of this document describes the industry affected by the MON, and Chapter 3 presents the industry's baseline organic HAP emissions. The baseline presentation includes current emissions from the affected industry and emission reductions expected from implementation of the proposed standards. Chapter 4 explains how we determined the maximum achievable control technology (MACT), "MACT floors," and regulatory alternatives for emission source types in the affected industry. Chapter 5 includes a summary of the proposed standards and presents rationale for the selection of the proposed standards. Chapter 6 presents the predicted impacts associated with the selected regulatory alternatives.

In compliance with President Clinton's June 1, 1998 Executive Memorandum on Plain Language in government writing, we have written this document using plain language. "We," "us," and "our" refer to the EPA.

2.0 DESCRIPTION OF THE AFFECTED INDUSTRY

The Miscellaneous Organic NESHAP (MON) applies to numerous processes within two broad source categories: the miscellaneous organic chemical manufacturing source category and the miscellaneous coating manufacturing source category. These two source categories are new source categories that subsume more than 20 of the source categories that were on the Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act (see 57 FR 31576, July 16, 1992) as well as many other organic chemical processes that either have been excluded from the applicability of emissions standards developed for other source categories or have not been included in a listed source category. The remainder of this chapter presents our rationale for creating these two source categories and identifies the processes that are included in the source categories.

2.1 SELECTION OF SOURCE CATEGORIES AND SUBCATEGORIZATION

We began collecting information in April 1995 to support development of emission standards for the listed organic chemical process source categories for which standards were required to be promulgated by November 15, 2000 ("ten-year standards"). The information collection activity included gathering process descriptions, sources and quantities of HAP emissions, and emission control levels that were publicly available. Data came principally from air pollutant inventories, construction and operating permits, and electronic databases for facilities located in states that have implemented comprehensive air emission inventory programs and that are home to a high concentration of chemical producers.

In addition, in 1997, we sent out approximately 200 Clean Air Act Section 114 information requests to facilities in Standard Industrial Classification (SIC) code 28 (North American Industrial Classification System [NAICS] subsector 325) to increase our industry database. We sent out two sets of information requests–one for chemical manufacturers, and one for coating manufacturers. In all, we collected information for more than 300 facilities falling within SIC code 28 (chemical production processes) and NAICS subsector 325 (chemical manufacturing), many of which can be broadly classified as "miscellaneous organic chemical processes." Information collected revealed that many of the organic chemical processes described by SIC code 28 and NAICS subsector 325, including 21 processes to be addressed by ten-year standards, involve similar process equipment, emission points, and control equipment. Many of them are collocated with other listed sources. Because of the similarities and collocation of these sources, we determined that it was technically feasible to regulate these sources collectively under two sets of standards, one to address processes primarily in which chemical reactions would take place, and one to address primarily mixing and formulation operations. Further, we reasoned that facilities with collocated processes could more easily comply with a single set of emission standards and compliance demonstration requirements (including record keeping and reporting) than with individual standards for each of the separate processes. Finally, a single set of standards applicable to each source category could address future production of materials not currently produced.

We did not subcategorize either source category. Based on the data that we collected, we did not see any apparent differences that would warrant subcategorization.

2.2 ORGANIC CHEMICAL MANUFACTURING

The listed source categories to which the miscellaneous organic chemical manufacturing MACT standards apply include the original 12 source categories listed under the Miscellaneous Process Industry Group, 8 source categories listed under the Polymers and Resins Industry Group, and 2 source categories listed in the Production of Inorganic Chemicals Industry Group. The 12 processes in the first group include production processes for benzyltrimethylammonium chloride, carbonyl sulfide, chelating agents, chlorinated paraffins, ethylidene norbornene, explosives, hydrazine, photographic chemicals, phthalate plasticizers, rubber chemicals, symmetrical tetrachloropyridine, and OBPA/1,3-diisocyanate. The 8 processes in the second group include production processes for alkyd resins, polyester resins, polyvinyl alcohol, polyvinyl acetate emulsions, polyvinyl butyral, polymerized vinylidene chloride, polymethyl methacrylate, and maleic anhydride copolymers. The third group includes quaternary ammonium compounds production and ammonium sulfate production from caprolactam by-product plants.

The miscellaneous organic chemical manufacturing source category also covers organic chemical processes that have been excluded from applicable requirements of other MACT standards. For example, the hazardous organic NESHAP excluded synthetic organic chemical manufacturing industry (SOCMI) batch reactor vents and processes using HAP only as a solvent. The Group I and IV polymers and resins source categories excluded the production of by-products, co-products, and intermediates not considered primary products. The Pesticide Active Ingredient MACT excludes the production of some pesticide intermediates. This source category also includes any organic chemical processes that might be developed in the future that would not be covered by any other MACT standards.

2.3 COATING MANUFACTURING

Much of the manufacture of coatings and paints consists solely of blending processes (and associated transfer operations), which do not include chemical reactions. Although these processes may use the same HAP-generating materials (organic solvents, for example), the mechanism for emitting HAP from these processes differ from the processes that involve chemical reactions. We considered the differences between these types of sources significant enough to warrant separate consideration and, thus, have developed separate control requirements and applicability cutoffs for them. This source category is distinguished by the nature of the process, rather than that of the product. The coatings manufacturing source category includes the Manufacturing of Paints, Coatings, and Adhesives source category from the surface coating processes Industry Group on the Initial List. More generally, it includes the manufacture of paints, inks, adhesives, and sealants in processes that are described under SIC codes 285 and 289 (NAICS 3255 and 3259), although it also includes the manufacture of any coatings that do not fall under these SIC codes. Other operations within SIC codes 285 and 289 (NAICS 3255 and 3259) that involve processing other than mixing and transfer operations are covered by the Miscellaneous Organic Chemical Manufacturing source category.

3.0 BASELINE EMISSIONS

The total baseline organic HAP emissions for the 387 existing major sources nationwide is an estimated 52,500 metric tonnes per year (Mg/yr). The 260 major sources operating in the chemical manufacturing source category accounted for approximately 85 percent of the estimated organic HAP emissions (Table 3-1); the 127 major sources operating in the coating manufacturing source category accounted for the remaining 15 percent (Table 3-2).

TABLE 3-1. ORGANIC HAP EMISSIONS BY EMISSION POINT FOR CHEMICAL MANUFACTURING

Emission source type	Uncontrolled emissions, Mg/yr	Baseline emissions, Mg/yr
Continuous Process Vents	164,000	4,170
Batch Process Vents	29,980	7,090
Storage Tanks	846	393
Equipment Leaks	23,300	20,600
Wastewater	22,100	12,400
Total	240,200	44,700

TABLE 3-2. ORGANIC HAP EMISSIONS BY EMISSION POINT FOR COATING MANUFACTURING

Emission source type	Uncontrolled emissions, Mg/yr	Baseline emissions, Mg/yr
Process Vessels	7,800	6,677
Storage Tanks[a]	64	64
Equipment Leaks	1,117	1,030
Wastewater[a]	14	14
Total	8,995	7,785

[a] Difference between uncontrolled and baseline emissions is less than 1 Mg/yr.

More than 120 different organic and inorganic HAP are emitted from major sources covered by the MON. The HAP most frequently reported and emitted in the largest quantities include methanol, hydrochloric acid, cresols, methylene chloride, methyl ethyl ketone, toluene, xylene, and vinyl acetate. These eight HAP represent approximately 75 percent of the total HAP emissions.

3.1 ORGANIC CHEMICAL MANUFACTURING

The following sections detail the basis for the baseline HAP emissions from each emission source type—process vents, storage tanks, equipment leaks, and wastewater. The information includes magnitude of the emissions, the current average control level, and the predominate HAP emitted from sources affected by the proposed standard.

3.1.1 Process Vents

Baseline HAP emissions data for process vents associated with batch chemical processes came from responses to a Section 114 survey. We consider the Section 114 survey information for batch process vents complete. Baseline HAP emissions data for process vents associated with continuous chemical processes were obtained from emission inventories maintained by seven state regulatory agencies for 61 major sources. According to 1995 information in EPA's Toxic Release Inventory (TRI), there are 121 major sources with continuous miscellaneous organic chemical processes—twice the number identified in the available state emission inventories. We extrapolated the available continuous process vent emissions data (from state-maintained inventories) to estimate the nationwide emissions for continuous process vents.

Process vents associated with batch and continuous processes are significant contributors to HAP emissions from the chemical manufacturing facilities. Their estimated total baseline emissions of HAP is 11,260 Mg/yr. Facilities within the Miscellaneous Organic Chemical Manufacturing source category make extensive use of add-on controls to reduce HAP emissions from process vents. They have reduced the uncontrolled HAP emissions of 194,000 Mg/yr by approximately 94 percent to the baseline level.

3.1.2 Storage Tanks

As for process vents, we estimated baseline HAP emissions from storage tanks using information in Section 114 survey responses and emission inventories maintained by seven state regulatory agencies. Again, we considered the Section 114 survey information for storage tanks associated with batch chemical processes complete and extrapolated the emission inventory data for storage tanks associated with continuous chemical processes.

The estimated baseline HAP emissions for all storage tanks is 393 Mg/yr. The widespread use of add-on controls such as condensers and combustion devices within the Miscellaneous Organic Chemical Manufacturing source category has already reduced the uncontrolled HAP emissions of 846 Mg/yr by approximately 54 percent.

3.1.3 Wastewater

Wastewater is one of the more significant sources of emissions from the Miscellaneous Organic Chemical Manufacturing source category. We estimated baseline HAP emissions for sources with batch processes using: (1) information about organic HAP loading information and treatment technologies reported in Section 114 survey responses and (2) factors used in the HON to estimate the fraction of each HAP emitted from the collection and treatment of wastewater (i.e., the Fe and Fr factors). Treatment technologies included steam strippers, air strippers venting to a combustion device, and combustion devices. Because the available information for continuous processes did not include wastewater HAP loads, we estimated wastewater emissions from continuous processes by extrapolating the estimated wastewater emissions from batch processes. These procedures resulted in estimated total baseline HAP emissions from wastewater of 12,400 Mg/yr, or a 44 percent reduction from the uncontrolled emissions of 22,100 Mg/yr.

3.1.4 Equipment Leaks

We estimated baseline HAP emissions for equipment components using leak detection and repair (LDAR) information in Section 114 survey responses and emission inventories maintained by the State of Texas and the State of Louisiana. First, we estimated emissions for a model batch and a model continuous process using information that EPA had collected to develop the average SOCMI emission factors. Model component counts and modified SOCMI emission factors were then used to estimate total hazardous air pollutant (HAP) emissions for a representative batch and continuous process. For each existing facility, uncontrolled emissions were estimated by multiplying the model process estimate by the actual number of reported processes at the facility. Baseline HAP emissions for each facility were calculated by assigning an efficiency associated with the LDAR program reported for each process. As a result, we estimated baseline HAP emissions for equipment leaks to be 20,600 Mg/yr, approximately 12 percent less than the uncontrolled value of 23,300 Mg/yr.

3.1.5 Transfer Operations

We did not estimate baseline emissions associated with transfer operations in this source category. In evaluating impacts of the selected emission limitations, we reviewed the MON database to determine how many products might meet the HAP partial pressure characteristic of 1.5 psia, and found only a few. Additionally, no single product or group of products that met the partial pressure cutoff at any one facility was found to be produced in quantities that would trigger the proposed transfer rack controls. Although we recognize that MON products may possibly be shipped in solution of HAPs or other materials, we did not collect data on these transfer operations. Therefore, we did not estimate baseline emissions for transfer operations.

3.2 COATING MANUFACTURING

3.2.1 Process Vessels/Tanks

We estimated baseline HAP emissions for both portable and stationary process vessels by extrapolating information from the Section 114 survey. The Section 114 survey did not request detailed information about HAP emissions from process vessels. We estimated uncontrolled HAP emissions assuming 1 percent of the storage tank throughput is emitted from the process vessels. This factor is roughly equivalent to the AP-42 emission factor of 1.5 lb VOC per 100 lb product for paint manufacturing. According to the survey responses, more than 90 percent of all process vessels are equipped with a cover, and some are equipped with both a cover and an add-on control device. Reduction efficiencies were reported for the control devices in the responses, and we assumed the covers reduce emissions by 10 percent. As a result, we estimated baseline emissions to be 6,677 Mg/yr, or about 14 percent less than the uncontrolled emissions of 7,800 Mg/yr.

3.2.2 Storage Tanks

We estimated baseline HAP emissions for storage tanks using procedures in AP-42 and information from a Section 114 survey. The Section 114 survey information is considered complete for storage tanks in the Miscellaneous Coating Manufacturing source category. The estimated baseline

HAP emissions for storage tanks is 63.8 Mg/yr. Facilities reported add-on controls for less than 4 percent of all storage tanks, which accounts for a negligible reduction from the uncontrolled emissions estimate of 64.5 Mg/yr. Control devices in use included carbon adsorbers and combustion devices. No facility reported using internal or external floating roofs to reduce HAP emissions from any storage tank.

3.2.3 Wastewater

We estimated uncontrolled and baseline HAP emissions to be 14.2 Mg/yr and 13.5 Mg/yr, respectively. These emissions were estimated using both: (1) organic HAP loading information from responses to a Section 114 survey of sources with coating manufacturing processes and (2) factors used in the HON to estimate the fraction of each HAP emitted from the collection and treatment of wastewater (i.e., the Fe and Fr factors). Baseline emissions are only slightly less than uncontrolled emissions because less than 10 percent of reported wastewater streams are controlled (primarily by drumming and disposal offsite).

3.2.4 Equipment Leaks

We estimated uncontrolled and baseline HAP emissions to be 1,117 Mg/yr and 1,030 Mg/yr, respectively. To estimate emissions, we first developed a model facility consisting of 140 components for 25 process vessels. We also developed emission factors for uncontrolled model facilities and for facilities implementing sensory and HON-based leak detection and repair (LDAR) programs. The factors for individual types of components were based on a subset of the data that were used to develop the SOCMI average emission factors and documented in a report on the effectiveness of different types of programs (see the docket). Using these factors, the reported number of process vessels at each facility, and the reported LDAR programs, we estimated the uncontrolled and baseline emissions at each affected facility. The baseline emissions are only 8 percent less than the uncontrolled emissions because only 30 percent of the affected facilities had implemented sensory LDAR programs, and those programs have an estimated reduction efficiency of only about 30 percent.

3.2.5 Transfer Operations

We did not estimate nationwide baseline emissions from coatings industry transfer operations because information about transfer operations was not requested in the Section 114 survey.

Furthermore, based on a review of the total throughput of HAP solvents used at the facility from data reported in the Section 114 questionnaire, we determined that only one facility had the potential to load coatings having HAP throughput and partial pressures high enough to require the use of transfer rack controls. The results for this facility are discussed in Chapter 6 of this document and in the referenced memorandum for coating facilities.

3.3 REFERENCES FOR CHAPTER 3

1. Memorandum from J. Fields and D. Randall, MRI, to MON Project File. July 31, 2000. Environmental and Energy Impacts for Chemical Manufacturing Facilities.

2. Memorandum from J. Fields and D. Randall, MRI, to MON Project File. July 31, 2000. Environmental and Energy Impacts for Coating Manufacturing Facilities.

4.0 MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY FLOORS AND REGULATORY ALTERNATIVES

The 1990 Clean Air Act Amendments require the development of standards to regulate sources of HAP emissions and further require that such standards reflect the maximum degree of HAP emission reduction achievable for new or existing sources. We refer to this level of control as the "maximum achievable control technology" (MACT) and the standards that require this level of control as "MACT standards." This chapter describes the regulatory requirements for MACT, our general approach to determining the MACT floors, specifics of the individual MACT floor determinations, and the resulting MACT floors. This chapter also describes regulatory alternatives that would achieve more control than the MACT floors.

4.1 REGULATORY REQUIREMENTS

MACT standards for existing sources must be no less stringent than the average emission limitation achieved by the best performing 12 percent of the existing sources for source categories and subcategories with thirty or more sources (or by the best performing five sources for source categories or subcategories with fewer than thirty sources). MACT standards for new sources must be no less stringent than the emission control achieved in practice by the best controlled similar source. These minimum levels of control are termed the "MACT floor" for existing and new sources, respectively. Consideration of regulatory alternatives with control levels more stringent than the MACT floor must include consideration of the cost of the emission reduction and any health and environmental impacts (other than air quality) and energy requirements.

4.2 GENERAL APPROACH TO DETERMINING THE MACT FLOOR

In general, we determined the MACT floor for these standards as follows:

1. Reviewed data collected from the representative affected facilities to determine whether some level of control exists at a sufficient percentage of facilities to qualify as a MACT floor.
2. Determined what existing controls would qualify as the best performing.
3. Ranked facilities according to "best performance."
4. For existing sources, determined the "central tendency" of the best performing 12 percent.
5. For new sources, determined the level of control achieved by the best-performing similar source.

We made these determinations separately for each emission source type (process vents, storage tanks, equipment leaks, transfer operations, and wastewater) in each of the source categories (chemical manufacturing and coating manufacturing). Further, we determined the MACT floors for process vents separately for batch and continuous processes.

The MACT floors were based primarily on data and information provided by affected sources in their Section 114 survey responses and information from permits for facilities in several States. We also took into account what we have learned about emission control technologies and their reduction potentials from previous standard development efforts for other chemical manufacturing industries.

4.3 MACT FLOOR FOR CHEMICAL MANUFACTURING PROCESSES AT EXISTING SOURCES

This section describes the process for determining the MACT floors for existing sources with batch and continuous chemical manufacturing processes. A number of memoranda located in the Miscellaneous Organic NESHAP Project File contain more detailed descriptions of the analyses described in this document, including data. Table 4-1 summarizes the MACT floor for chemical manufacturing processes at existing sources.

TABLE 4-1. MACT FLOOR FOR CHEMICAL MANUFACTURING PROCESSES AT EXISTING SOURCES

Emission source type	Required control	Performance level
Continuous process vents	98% emission reduction	Each vent within a facility with a TRE #2.6
Batch process vents	98% emission reduction	All vents in a process with total uncontrolled HAP emissions $10,000 lb/yr
Storage tanks	IFR/EFR or 95% emission reduction	Capacity $10,000 gal and HAP partial pressure of contents $1.0 psia
Wastewater streams	HON equivalent reduction of Table 9 HAP[a]	Total Table 9 HAP concentration $10,000 ppmw, or flow rate $10 lpm and total Table 9 HAP concentration $1,000 ppmw
Transfer operations	98% emission reduction of HAP	Throughput $0.65 million liters/yr and HAP partial pressure of $1.5 psia.
Equipment leaks	HON-equivalent LDAR program	All affected product processes

[a] "Table 9 HAP" refers to the HAP listed in Table 9 of 40 CFR part 63, subpart G.

4.3.1 Process Vents

4.3.1.1 Affected Vent Population. We considered all process vents associated with continuous and batch product processes except for vents with concentrations of less than 50 ppmv (which is consistent with *de minimis* concentrations used in other standards, such as the HON). We did not consider any of the inorganic material content of reported vent streams because they typically require different control technologies than those for organic HAP. We also assigned a control efficiency of 0 percent to all scrubber controls.

We determined MACT floors separately for vents from continuous processes and those from batch processes. To be consistent with the format of MACT standard for other source categories with batch processes, we grouped data for batch vents within each process. For continuous process vents, we evaluated data on an individual vent-by-vent basis. The resulting process vent population included 202 continuous vents in 55 processes located at 44 facilities and 731 batch processes located at 144 facilities; 4 of the facilities have both continuous and batch process vents.

4.3.1.2 Existing Controls. The HAP control levels for approximately 18 percent of the continuous vents and 18 percent of the processes with batch vents both were reported to be 98 percent or more, excluding scrubbers. Thus, a MACT floor level of control exists for both vent populations.

Responses to the Section 114 industry questionnaire indicated use of scrubbers on organic HAP streams typically to remove water-soluble pollutants such as methanol from process vents. However, the pollutants may only be transferred from one media to another (i.e., absorbed from the process vent into the scrubbing media), rather than being destroyed or recovered. Concerned that these water-soluble pollutants may not be recovered or destroyed, we excluded scrubber controls from the determination.

4.3.1.3 Ranking of Controlled Vents. We used the TRE values to rank continuous process vents at each facility and to rank facilities that control vents to the MACT floor level of control (i.e., 98 percent reduction). If vents have equivalent controls, we considered the vents with high TRE values to be more stringently controlled than vents with lower TRE values.

We ranked all of the vents within each facility by TRE values in ascending order (low to high) to determine the TRE "threshold" (i.e., the maximum TRE value at and below which all continuous process vents are controlled at the MACT floor level of control). The threshold was established by starting with the vent having the lowest TRE and determining if it was controlled to the MACT floor level. If it was not, the facility had no threshold. If the vent was controlled to the MACT floor level, we conducted the same determination for the vent with the next lowest TRE value. We continued this process until we found a vent that was not controlled to the MACT floor level. The threshold was set at the preceding TRE value.

We ranked batch process vents that are collectively controlled within a process at the MACT floor level according to total uncontrolled HAP emissions. Our experience is that batch vents are commonly manifolded within a process before control, because the volumetric flow rates associated with batch vents typically are small and collective control is more cost effective. Batch product processes with MACT floor equivalent controls (98 percent) and low total uncontrolled HAP emissions are considered more stringently controlled than similarly controlled vents with higher uncontrolled HAP emissions. We ranked the processes in ascending order (low to high) to determine the top performing 12 percent of batch product processes.

4.3.1.4 MACT Floor Determination. For continuous process vents, we determined the top performing 12 percent of sources by ranking facilities by their respective TRE performance level (determined as described above). Facilities with the highest TRE performance level were considered the best performing. The top 12 percent of the 44 facilities with continuous process vents corresponds to the top 5 facilities. We determined that the average TRE performance level of 2.6 represented the "central tendency" of the top facilities because the TRE values for the top performing facilities were evenly distributed over a narrow value range.

For batch process vents, product processes with the lowest total uncontrolled HAP emissions are the best performing facilities. The top 12 percent of the 731 batch product processes corresponds to the top 88 processes. The average performance level for the top product processes is total uncontrolled HAP emissions of 15,200 lb/yr. We determined that the median performance level of 10,000 lb/yr of uncontrolled HAP emissions represented the "central tendency" of the top product processes because the HAP emission values for the top performing facilities represented a skewed distribution over a large value range. The median performance level for the top product processes is total uncontrolled HAP emissions from the product process of 10,000 lb/yr (rounded up from 9,860 lb/yr).

4.3.2 Storage Tanks

4.3.2.1 Affected Tank Population. We considered all storage tanks associated with continuous and batch product processes. We did not request data on tanks with capacities less than 10,000 gal or tanks storing materials with a HAP content less than 5 percent by weight to be consistent with the classes of tanks covered by the HON. As for process vents, we excluded from consideration any inorganic constituents of stored material. The resulting tank population included 1,195 tanks located in 132 facilities.

4.3.2.2 Existing Controls. Approximately 16 percent of storage tanks are reported as being equipped with an internal or external floating roof (IFR/EFR) or a control device achieving a HAP emission reduction efficiency of 95 percent or more, excluding scrubbers. Therefore, a MACT floor level of performance exists for storage tanks. This level of control is consistent with the HON and other chemical industry MACT standards. As for process vents, we excluded scrubbers from the MACT floor assessment because they are typically used to remove water-soluble pollutants such as methanol from storage tank vents and may only be transferring the pollutant from one media to another, rather than recovering or destroying them.

4.3.2.3 Ranking of Controlled Tanks. We used the HAP partial pressure of the material stored in the tanks to rank those controlled at the MACT floor level (that is, with a floating roof or 95 percent control) and to determine the best performing 12 percent. We consider tanks with MACT floor equivalent controls and storing materials with a low HAP partial pressure more stringently controlled than similar tanks storing materials with a higher HAP partial pressure.

The affected source includes all tanks located in each facility operating continuous and/or batch product processes. We ranked all tanks at each facility by the corresponding HAP partial pressure in descending order (high to low) to determine the partial pressure "threshold" at and above which all tanks are controlled at a MACT floor level of performance. Starting with the tank containing material with the highest HAP partial pressure, we confirmed whether this tank was controlled at the MACT floor level. If not, the facility had no applicable threshold value. If the tank was controlled at the MACT floor level, we made the same assessment for the tank with the next-to-highest HAP partial pressure. We repeated the process until we identified a tank not meeting the MACT floor performance level. The HAP partial pressure of the material in the previous tank defined the threshold value for the facility.

We applied a *de minimis* limit of 0.05 psia to the HAP partial pressure. Many tanks in the affected tank population store ethylene glycol and/or glycol ethers (EG/GE) and have HAP partial pressures less than 0.05 psia. The Polymer and Resin II rule has excluded tanks storing EG/GE because the potential for emissions from these tanks is very low. For the MON, all tanks storing materials with a HAP partial pressure equal to or less than 0.05 psia account for approximately 0.5 percent of the total baseline emissions for storage tanks.

4.3.2.4 MACT Floor Determination. For storage tanks, we determined the top performing 12 percent of facilities by ranking the facilities in ascending order by their threshold value (determined as described above). Facilities with the lowest threshold values are considered the best performing. The top 12 percent of the 132 facilities corresponds to the top 16 facilities. The median threshold value for the top 12 percent of facilities is a HAP partial pressure of 0.6 psia; the average threshold value for the top 12 percent of facilities is a HAP partial pressure of 1.0 psia (rounded up from 0.93 psia). We determined that the average performance level of 1.0 psia best represented the different HAPs stored, and thus represented the "central tendency" of the top facilities, because the partial pressures were fairly evenly distributed across the range.

4.3.3 Wastewater

4.3.3.1 Affected Wastewater Stream Population. From all wastewater streams generated from continuous and batch chemical manufacturing processes, we excluded those with HAP concentrations less than 1,000 ppmw. Also, we excluded all HAP that are not listed in Table 9 of subpart G of the HON (Table 9 HAP). The wastewater stream population used in this analysis includes 363 streams located in 60 facilities.

4.3.3.2 Existing Controls. Facilities reported that approximately 12 percent of all wastewater streams are treated with a steam stripper, an air stripper followed by an incinerator, or a combustion device at an on-site or off-site location. We did not request data on the efficiency of wastewater control devices, but our knowledge of the reported technologies supports the assumption that existing devices would meet HON-equivalent control requirements, which specify various levels of required reductions (Fr), depending on the identity of wastewater compounds.

4.3.3.3 Grouping of Wastewater Streams. We used two parameters to indicate performance level for wastewater streams: the concentration of HAP in the stream (ppmw) and the flow rate of the stream (lpm). Wastewater streams with MACT floor equivalent controls and low HAP concentrations and low flow rates are considered more stringently controlled than similar wastewater streams with higher HAP concentrations and higher flow rates. For each wastewater stream, we determined whether it met one of the following:

- A Table 9 HAP concentration of 10,000 ppmw or
- A flow rate of 10 lpm and a Table 9 HAP concentration of 1,000 ppmw.

The Table 9 HAP concentration and flow rate cutoffs are consistent with other MACT standards (i.e., the HON). Based on our knowledge of the miscellaneous organic chemical manufacturing industry, we concluded that the wastewater conveyance and treatment systems used for HON-affected wastewater streams are also used for affected wastewater streams in this source category. Therefore, using the same Table 9 HAP concentration and flowrate cutoffs simplifies applicability for colocated sources. The affected source included all wastewater streams at each facility operating continuous and/or batch product processes.

4.3.3.4 MACT Floor Determination. Of the 186 wastewater streams meeting the selected HAP concentration and flow rate criteria, 37 (approximately 20 percent) are controlled at the level required by the HON. A MACT floor exists for this group of wastewater streams because more than 12 percent of the affected sources are controlled at a MACT floor level of performance.

4.3.4 Equipment Leaks

4.3.4.1 Affected Equipment Component Population. The affected source includes equipment components associated with facilities operating continuous and batch chemical operations. Again, our MACT floor determination ignored inorganic materials such as hydrogen chloride, hydrogen fluoride, and chlorine. The affected source population includes 202 facilities. Batch processes exist at approximately 75 percent (151) of the facilities, and continuous processes exist at about 28 percent (56) of the facilities (5 facilities have both types of processes).

4.3.4.2 Existing Controls. Affected facilities reported implementing some type of a structured LDAR program for equipment components at approximately 33 percent of facilities with continuous and batch chemical processes. Therefore, a MACT floor level of performance exists for equipment components.

We evaluated the effectiveness of various LDAR programs using a set of model plants. According to the model, the HON LDAR program reduces HAP emissions by 63 to 75 percent for continuous chemical processes and 70 to 73 percent for batch chemical processes. The model demonstrated that several LDAR programs implemented by Louisiana and Texas regulatory agencies are equivalent to the HON LDAR program when applied to continuous chemical processes. LDAR programs for continuous chemical processes that are equivalent to the HON include the following:

- The State of Louisiana non-HON LDAR program, which is estimated to reduce HAP emissions by as much as 70 percent; and
- The State of Texas LDAR programs TX28VHP, TX28MID, and TX28RCT, all of which are estimated to reduce HAP emissions by as much as 73 percent.

4.3.4.3 Ranking of Facilities with Leak Detection and Repair Programs. We ranked facilities implementing an LDAR program according to its estimated overall effectiveness in reducing HAP emissions. Facilities implementing LDAR programs with the highest overall effectiveness in reducing HAP emissions are the best performing sources.

4.3.4.4 MACT Floor Determination. The top 12 percent of the 202 facilities corresponds to the top 22 facilities. Thirty facilities implement the HON LDAR program or a program equivalent to the HON. Sixteen of the facilities with batch processes specifically use a HON LDAR program, and 14 of the facilities with continuous processes use the HON or equivalent LDAR program. Therefore, the "central tendency" of the top facilities is the HON LDAR program.

4.3.5 Transfer Operations

4.3.5.1 MACT Floor Determination. We did not collect any information on transfer operations for this source category. Our MACT floor determination is based on colocation. A significant portion of the facilities in the MON chemicals source category (approximately 60 percent of facilities located in Texas and Louisiana) contain emission sources that are currently subject to the HON, and we assume that the transfer operations will not be exclusive to only HON products (i.e., the same loading racks can be used for MON or HON products) . Therefore, we determined that the MACT floor for this source category would be equivalent to the HON requirements for transfer operations.

4.4 MACT FLOOR FOR CHEMICAL MANUFACTURING PROCESSES AT NEW SOURCES

This section describes how we determined the MACT floors for batch and continuous chemical manufacturing processes at new sources. This step in the MACT floor determination is based on the evaluations and source rankings described in Section 4.3. After determining the "central tendency" of the top-performing 12 percent of sources (to establish the MACT floor for existing sources), we determined what source or level of control represents "the best controlled similar source." As for existing sources, there are two elements of the floor: the control technology or level of control (emission reduction) and the threshold at which such technology or level of control must be applied. A number of documents located in the Miscellaneous Organic NESHAP Project File, Docket No.: [A-

96-04] contain a more detailed description of this analysis, including data. Table 4-2 summarizes the MACT floor for chemical manufacturing processes at new sources.

TABLE 4-2. MACT FLOOR FOR CHEMICAL MANUFACTURING PROCESSES AT NEW SOURCES

Emission source type	Required control	Performance level
Continuous process vents	98% emission reduction	Each vent within a facility with a TRE # 5.0
Batch process vents	98% emission reduction	All vents in a process with total uncontrolled HAP emissions $ 3,000 lb/yr
Storage tanks	IFR/EFR or 95% emission reduction	Capacity $ 10,000 gal and HAP partial pressure of contents $ 0.1 psia
Wastewater streams	HON-equivalent for Table 8 and Table 9 HAP[a,b]	Total Table 9 HAP conc. $ 10,000 ppmw, or Flow rate $ 10 lpm and total Table 9 HAP conc. $ 1,000 ppmw, or Flow rate $ 0.02 lpm and total Table 8 HAP conc. $ 10 ppmw
Transfer operations	98% emission reduction of HAP	Throughput $ 0.65 million liters/yr and HAP partial pressure of 1.5 psia.
Equipment leaks	HON-equivalent LDAR program	All affected product processes

[a] Table 9 HAP are the HAP listed in Table 9 of 40 CFR 63 subpart G.
[b] Table 8 HAP are the HAP listed in Table 8 of 40 CFR 63 Subpart G.

4.4.1 Process Vents

The level of performance determined for the new source MACT floor is a HAP emission reduction efficiency of 98 percent or more. Although HAP emission reductions exceeding 98 percent were reported for some processes, such reductions were typically effected using combustion control devices such as thermal oxidizers, and test data supporting and validating these results were not available. In addition, diverse process vent characteristics such as varying flow rates, types of pollutants, and pollutant concentrations make it difficult to conclude that emissions from all process vents could be reduced by more than 98 percent. Therefore, the best demonstrated performance level is a HAP emission reduction of 98 percent, which is consistent with the performance level determined for MON existing sources. The MACT floor level of performance established for new continuous and batch vents is also consistent with the HON and other chemical industry MACT standards.

The performance criteria corresponding to the best-performing facility was a TRE "threshold" value of 5.0. The Mobil Chemical Company in Beaumont, Texas, is controlling all continuous vents with a TRE value of 5.0 or less at a level of 98 percent.

The best performing MON batch source that is representative of all batch processes is a product process which has total uncontrolled HAP emissions of approximately 1,360 kg/yr (3,000 lb/yr) and is reducing HAP emissions from the process by 98 percent.

4.4.2 Storage Tanks

The best performing sources that are representative of all storage tanks achieve a 95 percent reduction using carbon adsorption. This level of control is consistent with that determined for MON existing sources and with the HON and other chemical industry MACT standards. It also is consistent with floating roof technology, a technology that in many cases is integral to the tank design. The performance criterion corresponding to the best facilities was a HAP partial pressure "threshold" of 0.1 psia. This partial pressure corresponds to styrene and xylene, which are stored in a tanks with a capacities as small as 11,000 gal. Therefore, the MACT floor for new source storage tanks requires 95 percent reduction in HAP emissions (or that the storage tank be equipped with an internal or external floating roof) for storage tanks with a capacity greater than 10,000 gal and storing material with a HAP partial pressure greater than 0.1 psia.

4.4.3 Wastewater

Control of the top performing wastewater streams included a variety of control techniques such as steam stripping, air stripping followed by incineration, and thermal oxidation at on- or off-site locations. These devices are believed to be able to achieve a level of performance that is consistent with the performance level determined for MON existing sources and wastewater sources covered by the HON. In establishing the new source MACT floor for wastewater, we could not identify single streams in the database that met the HON new source applicability of 0.02 lpm and 10 ppmw Table 8 HAP because we did not ask for data on wastewater streams with less than 1,000 ppmw HAP. However, we concluded, based on our knowledge of the miscellaneous organic chemical industry and our previous analysis indicating that many MON sources are colocated with HON sources, that the wastewater conveyance and treatment systems used to convey and control HON-affected wastewater streams also convey and control affected wastewater streams in this source category. Therefore, we also concluded that the new source MACT floor for MON facilities would also be equivalent to the HON level of control for new sources.

Therefore, the MON MACT floor for new source wastewater streams requires HON-equivalent reductions for wastewater streams with a flow rate of 0.02 lpm or more and a total Table 8 HAP concentration of 10 ppmw or more. In addition, the new source MACT floor for wastewater streams containing Table 8 HAP less than 10 ppmw is the MON MACT floor for existing wastewater streams, that is, a total Table 9 HAP concentration of at least 10,000 ppmw, or a flow rate of at least 10 lpm and total Table 9 HAP concentration of at least 1,000 ppmw.

4.4.4 Equipment Leaks

We determined that the new source MACT floor for equipment components is a HON-equivalent LDAR program for all facilities with either continuous or batch chemical operations. The HON LDAR program is the most effective overall program compared to other federal and state LDAR programs (as described in Section 4.3.4), and the top 16 facilities with batch processes and the top 14 facilities with continuous processes have implemented a HON-equivalent LDAR program.

4.4.5 Transfer Operations

We did not collect information about transfer operations as part of the industry survey. However, as discussed in section 4.3.5 of this document, we know that many of the facilities in Texas and Louisiana that have miscellaneous organic chemical manufacturing processes also have processes that are subject to the HON, and we anticipate that loading racks at these facilities are used for both HON and MON products. The HON requirements are also the most stringent known requirements. Therefore, the MACT floor for transfer operations at new sources is the HON requirements, which consist of 98 percent control of loading racks with a throughput greater than or equal to 0.65 million liters/yr and a HAP partial pressure greater than or equal to 1.5 psia.

4.5 REGULATORY ALTERNATIVES FOR CHEMICAL MANUFACTURING

We developed regulatory alternatives that are more stringent than the MACT floor for process vents, storage tanks, and wastewater emission points at existing sources. We also developed a regulatory alternative for wastewater emission points at new sources. The required control levels for these emission points (e.g., 98 percent control for process vents) are the same as for the MACT floor. However, the applicability criteria for the regulatory alternatives are more stringent, requiring the installation of controls on a larger group of affected sources. These options are described in the subsections below and are summarized in Table 4-3.

For existing sources, we did not develop more stringent options than the MACT floor for equipment leaks or transfer operations. For equipment leaks, the HON LDAR program is the most stringent program available, and, therefore, there were no above-the-floor options to consider. For transfer operations, we did not consider a beyond-the-floor option because we did not have industry-specific data indicating the existence of any above-the-floor option and, based on the high control level of the HON requirements (which we believe represent the MACT floor), we do not believe it is likely that there would be any such options for which the cost would be reasonable.

TABLE 4-3. SUMMARY OF REGULATORY ALTERNATIVES FOR MISCELLANEOUS ORGANIC CHEMICAL MANUFACTURING SOURCES

Type of source	Emission source type	Required control	Applicability cutoffs[a]
Existing	Continuous process vents	98 percent reduction	Vents with TRE #5.0
	Batch process vents	98 percent reduction	Processes with uncontrolled HAP emissions $5,000 lb/yr
	Storage tanks	IFR, EFR, or 95 percent reduction	Tank capacity $10,000 gal and HAP partial pressure $0.5 psia
	Wastewater	HON equivalent	Total Table 9 HAP conc. $10,000 ppmw, or Flow rate $1 lpm and total Table 9 HAP conc. $500 ppmw
New	Wastewater	HON equivalent	Total Table 9 HAP conc. $10,000 ppmw, or Flow rate $1 lpm and total Table 9 HAP conc. $500 ppmw, or Flow rate $0.02 lpm and total Table 8 HAP conc. $10 ppmw

[a] Table 8 HAP and Table 9 HAP are listed in Tables 8 and 9 of 40 CFR 63, subpart G.

For new sources, we did not develop regulatory alternatives for process vents, transfer operations, and storage tanks because the new source MACT floor is already more stringent than either the MACT floor or a more stringent alternative for existing sources for which costs were reasonable. For equipment leaks, we did not develop a regulatory alternative because the subpart H program is already the most stringent program.

4.5.1 <u>Existing Sources</u>

For batch process vents, the beyond-the-floor regulatory alternative is the control of all batch vents within a process with uncontrolled emissions greater than or equal to 2,270 kg/yr (5,000 lb/yr). The 2,270 kg/yr (5,000 lb/yr) value was selected for the alternative because it represents the midpoint between the MACT floor value and no cutoff. A cutoff is necessary because the required performance level is high (98 percent) and some allowance for less cost effective or difficult to control vents should be available.

For continuous process vents, our regulatory alternative applicability level is a TRE of 5.0 (the MACT floor TRE is 2.6). This level coincides with the new source MACT floor and is an indication that the level is technically feasible to achieve, since at least one facility in the industry is currently controlling a stream(s) with this TRE value.

For storage tanks, the beyond-the-floor regulatory alternative vapor pressure applicability is greater than or equal to 3.4 kPa (0.5 psia). The capacity applicability remains at 38 m^3 (10,000 gal), the size of a small storage tank. An applicability cutoff in terms of vapor pressure is reasonable, so that nonvolatile materials are not required to be controlled. Therefore, we selected a vapor pressure cutoff halfway between the MACT floor applicability cutoff and zero.

For wastewater, we developed a beyond-the-floor option that changed one of the two sets of applicability criteria relative to the MACT floor. This option has flowrate and concentration applicability cutoffs of 500 ppmw and 1 lpm. We developed an option based on these applicability criteria to be consistent with the applicability cutoffs provided in the Wastewater NSPS (40 CFR part 63, subpart YYY). The beyond-the-floor option also includes the same applicability cutoffs of 10,000 ppmw at any flow rate as for the MACT floor.

4.5.2 <u>New Sources</u>

For wastewater, our beyond-the-floor option combines the same performance level of the MACT floor with the most stringent applicability cutoffs of both the new source MACT floor and the beyond-the-floor option for existing sources. Thus, the applicability cutoffs for this option consist of

10,000 ppmw of Table 9 HAP at any flow rate, 500 ppmw of Table 9 HAP at flow rates greater than 1 lpm, and 10 ppmw of Table 8 HAP at flow rates greater than 0.02 lpm.

4.6 MACT FLOOR FOR MISCELLANEOUS COATING MANUFACTURING AT EXISTING SOURCES

This section describes how we determined the MACT floor for sources of emissions from miscellaneous coating manufacturing processes at existing sources. Additional memoranda to the Miscellaneous Organic NESHAP Project File, Docket No.: [A-96-04] include more detailed description of analyses, including data. Table 4-4 summarizes the MACT floor for miscellaneous coating processes at existing sources.

TABLE 4-4. MACT FLOOR FOR SURFACE COATING MANUFACTURING PROCESSES AT EXISTING FACILITIES

Emission source type	Required control	Performance level
Process tanks/ vessels	Fixed or removable cover	Portable process tanks $ 250 gal
	Fixed or removable cover and 60% emission reduction	Stationary process tanks $ 250 gal
Storage tanks	None	
Wastewater	HON equivalent	Wastewater streams with total Table 9 HAP[a] conc. $ 4,000 ppmw
Transfer operations	None	
Equipment leaks	Sensory LDAR program	All affected processes

[a] Table 9 HAP are listed in 40 CFR 63 subpart G.

4.6.1 Process Tanks/Vessels

4.6.1.1 Affected Tank/Vessel Population. Our assessment included all process tanks and vessels associated with miscellaneous coating manufacturing processes. The total source population is 7,639 process tanks and vessels located in 127 facilities. Stationary process tanks and vessels account for approximately 61 percent (4,628) of the process tank population and are located in 122 facilities. Portable process tanks and vessels account for the remaining 39 percent (3,011) of the process tank population and are located in 88 facilities. Because different technical considerations must be made for controlling emissions from portable tanks, we distinguished between portable and stationary tanks and determined the MACT floor for these sources separately.

4.6.1.2 Existing Controls. Approximately 92 percent (2,783) of the portable tanks are reportedly equipped with a fixed or removable cover, and 3 percent (108) of the portable tanks are reportedly equipped with a control device (e.g., thermal oxidizer or carbon adsorber). Because covers are the most effective emission reduction measure in use by more than 12 percent of MON portable process tanks, a fixed or removable cover corresponds to the MACT floor level of performance.

As with the portable process tanks, approximately 98 percent of the stationary process tanks (4,558) are reportedly equipped with fixed or removable cover. Approximately 8 percent of the stationary tanks (368 tanks) are also reportedly routing emissions to an add-on control device. Because a minimum of 6 percent of the MON stationary process tanks are reportedly equipped with a cover and a control device (the most effective combination of emission reduction measures in use by stationary process tanks), a MACT floor level of performance exists for stationary process tanks.

4.6.1.3 MACT Floor Determination. We selected the presence of a cover on each process tank and the emission reduction efficiency of an add-on control device as measures of performance to rank process tanks controlled at a MACT floor level. A tank equipped with a cover and a control device with a high emission reduction efficiency is more stringently controlled than a similar tank with just a cover. We ranked the process tanks with add-on controls by the corresponding control device efficiency in descending order (high to low). Below these tanks, we ranked tanks equipped only with covers in descending order (high to low) by the number of tanks at each facility. We ranked portable and stationary tanks separately.

The top 12 percent of the 3,011 portable process tanks corresponds to the top 361 tanks. Only 108 of the top 361 portable process tanks were equipped with a cover and an add-on control device, while the remaining 253 tanks were equipped only with a cover. Because portable process tanks equipped with add-on controls represent less than 6 percent of the affected sources, the "central tendency" of the top performing tanks is a portable process tank equipped only with a fixed or removable cover. We have not determined a specific HAP emission reduction efficiency corresponding to the sole use of covers to reduce HAP emissions from process tanks.

The top 12 percent of the 4,628 stationary process tanks corresponds to the top 555 tanks. Of the top performing stationary process tanks, 368 tanks were equipped with a cover and an add-on control device. The remaining 187 tanks were equipped only with a cover. Since stationary process tanks equipped with add-on controls represent approximately 8 percent of the affected sources, a “central tendency” of the top performing tanks can be expressed numerically as a median or mean control efficiency value. The median performance level for the top facilities is an add-on control device with an efficiency of at least 80 percent; the average performance level for the top facilities is an add-on control device with an efficiency of at least 60 percent (rounded up from actual value of 57 percent). We determined that the average performance level of 60 percent control represented the “central tendency” of the top facilities because the control device efficiencies for the top performing facilities represented a fairly even distribution.

4.6.2 Storage Tanks

We included all storage tanks associated with miscellaneous coating manufacturing processes in the MACT floor determination, except for those with capacities less than 10,000 gal or containing material with a total HAP content less than 5 percent by weight (for which we did not request information). As for the miscellaneous chemical manufacturing processes, we did not include inorganic compounds in this analysis.

After excluding inappropriate and incomplete data, the total source population is 449 storage tanks at 60 facilities. The facilities report a control device (e.g., thermal oxidizer or carbon adsorber) for only about 4 percent (18) of the tanks. None of the storage tanks is reportedly equipped with an internal or external floating roof. To determine whether any subgroup of tanks was controlled sufficiently to indicate some consistent level of control, we grouped the tanks into three capacity ranges (consistent with the HON):

- 10,000 gal # tanks < 20,000 gal
- 20,000 gal # tanks < 40,000 gal
- 40,000 gal # tanks

For each storage capacity range, less than 6 percent of the storage tanks are equipped with a control device. Thus, because we did not identify means by which sources are currently reducing emissions that is sufficiently widespread to constitute a MACT floor, we are not establishing a MACT floor for storage tanks at existing sources.

4.6.3 Wastewater

4.6.3.1 Affected Wastewater Stream Population. We included in our MACT floor determination all wastewater streams generated from miscellaneous coating manufacturing processes, except those containing HAP concentrations less than 1,000 ppmw. Again, we excluded inorganic materials such as hydrochloric acid and chromium compounds from the analysis. The final wastewater stream population includes ten streams generated by nine facilities.

4.6.3.2 Existing Control. Fifty percent of the ten wastewater streams generated from miscellaneous coating manufacturing processes are reportedly treated in a combustion device at an off-site location. These controlled wastewater streams are also characterized as hazardous waste under the Resource Conservation and Recovery Act (RCRA). We did not request data on the efficiency of wastewater control devices, but our knowledge of the listed treatment technologies and the applicability of the air emission standards for RCRA treatment facilities (40 CFR 264, subparts AA, BB, and CC) supports a Table 9 HAP emissions reduction equivalent to the HON requirements. In general, the HON performance level is that achieved by a steam stripper meeting minimum design specifications or other device capable of meeting HAP-specific mass fraction removal (Fr) efficiencies. Because a combustion device is capable of achieving a HON-equivalent Table 9 HAP reduction, a MACT floor performance level of the HON exists for wastewater streams.

4.6.3.3 MACT Floor Determination. We based our measure of performance on HAP concentration. Wastewater streams with MACT floor equivalent controls and low HAP concentrations are more stringently controlled than similar wastewater streams with higher HAP concentrations. We determined the top performing streams by ranking individual wastewater streams in the following sequence:

- Level of control equivalent to the existing MACT floor for HON wastewater, and
- Total HAP concentration in wastewater (ascending order).

Because facilities reported fewer than 30 wastewater streams, the MACT floor is represented by the 5 top performing streams, all of which are reportedly treated offsite in a combustion device as a

RCRA waste. For the top performing streams, the HAP concentration ranged from 1,600 ppmw to 100,000 ppmw. The "central tendency" of the top performing wastewater streams can be expressed numerically as a median or mean of the performance values. The median performance level for the top wastewater streams corresponds to the wastewater stream with a HAP concentration of 4,000 ppmw. We determined that the median performance level better represented the "central tendency" of the top facilities because the wastewater HAP concentrations for the top performing facilities represented a skewed population distribution.

4.6.4 Equipment Leaks

The affected source population for equipment leaks is all of the facilities in the source category (i.e., all 127 facilities that responded to the EPA survey). Facilities reported structured LDAR programs at approximately 39 percent (49) of the miscellaneous coating manufacturing facilities.

We used LDAR program characteristics such as leak detection method, leak definition, and inspection frequency as a measure of performance to determine the best performing facility. In general, LDAR programs following EPA reference Method 21 (instrument monitoring) are more stringent than sensory detection methods (i.e., audible, visual, or olfactory inspections). Also, LDAR programs defining leaks at lower screened concentrations (e.g., 500 ppmv or 1,000 ppmv above background concentrations) and requiring more frequent equipment inspections (e.g., monthly or quarterly) are considered more stringent options than LDAR programs using higher concentration leak definitions and less frequent inspections. Facilities implementing LDAR programs that require instrument monitoring, define leaks with lower concentrations, and require more frequent equipment inspections are considered the better performing sources.

We ranked all facilities by LDAR program characteristics in the following sequence:

- Detection method: Method 21 and sensory procedures.
- Inspection frequency: daily, weekly, monthly, quarterly, and annually.
- Leak definition above background concentrations: 500 ppmv, 1,000 ppmv, 10,000 ppmv, and sensory observation.

The top 12 percent of the 127 facilities corresponds to the top 15 facilities. One facility, PPG Industries in Oak Creek, Wisconsin, reported a facility-wide LDAR program using an OVA, a leak definition of 10,000 ppmv, and various inspection frequencies (monthly, quarterly, and annually) corresponding to different equipment components. The next 14 ranked facilities reported using a monthly sensory detection LDAR program. Characteristics of the reported monthly sensory LDAR programs were considered equivalent to LDAR characteristics of the bulk gasoline terminal NESHAP. Thus, the "central tendency" of the top performing facilities is a monthly sensory LDAR program equivalent to the bulk gasoline terminal NESHAP.

4.6.5 Transfer Operations

No data were requested regarding transfer operations at coating facilities. We reviewed existing information sources and found that state VOC rules are currently in place for the loading of transport vessels such as tank trucks and rail cars, but that there are typically no control requirements for loading of bins, totes, and drums, which we believe to represent the majority of transfer operations in this source category. Therefore, because we are not aware of any existing rules that apply to the loading of these containers, we are not establishing a MACT floor for existing sources.

4.7 MACT FLOOR FOR MISCELLANEOUS COATING MANUFACTURING AT NEW SOURCES

This section describes how we determined the MACT floors for miscellaneous coating manufacturing processes at new sources. This step in the MACT floor determination process is based on the evaluations and source rankings described in Section 4.6 for miscellaneous coating manufacturing processes at existing sources. After determining the "central tendency" of either the top-performing 12 percent of sources or the top-performing five sources for populations of less than 30 sources, we determined what source or level of control represents "the best controlled similar source." As for existing sources, there are two elements of the floor: the control technology or level of control (emission reduction) and the threshold at which such technology or level of control must be applied. Various memoranda to the Miscellaneous Organic NESHAP Project File, Docket No.: [A-96-04] contain more detailed description of these analyses, including data. Table 4-5 summarizes the MACT floor for miscellaneous coating manufacturing processes at new sources.

TABLE 4-5. MACT FLOOR FOR MISCELLANEOUS COATING MANUFACTURING AT NEW SOURCES

Emission source type	Required control	Performance level
Portable Process tanks/vessels	Fixed or removable cover venting to a control device capable of 95% emission reduction	Tanks/vessels $ 250 gal
Stationary process tanks/vessels	Fixed or removable cover venting to a control device capable of 95% emission reduction	Tanks/vessels $ 250 gal
Storage tanks	90% emission reduction	Capacity $ 25,000 gal and HAP partial pressure of contents $ 0.1 psia Capacity $ 20,000 gal and <25,000 gallons and HAP partial pressure of contents $ 1.5 psia
Wastewater streams	HON equivalent	Total Table 9 HAP[a] conc. $ 2,000 ppmw
Transfer operations	None	
Equipment leaks	Sensory LDAR program	All affected product processes

[a] Table 9 HAP are listed in Table 9 of 40 CFR 63 subpart G.

4.7.1 Process Tanks/Vessels

For both portable and stationary process tanks, the best demonstrated level of performance (and thus the MACT floor for these sources) is a fixed or removable cover which vents to a control device achieving a HAP emission reduction efficiency of 95 percent or more. The BASF plant in Belvidere, New Jersey reported 72 portable process tanks being controlled by a thermal oxidizer achieving 95 percent control efficiency. The BASF plant in Detroit reported three stationary process tanks being controlled by a carbon adsorber achieving 95 percent control efficiency.

PPG Industries in Springdale, Pennsylvania, report reducing HAP emissions from their portable and stationary process tanks by 99 percent using fixed covers which vent to a thermal oxidizer. However, source test data to support and validate the reported 99 percent reductions were not available. In addition, diverse process tank characteristics such as fixed and removable covers, varying flow rates, types of pollutants, and pollutant concentrations make it difficult to conclude an efficiency of 99 percent or more can be achieved for all covered process tanks. Therefore, we did not consider the control achieved for PPG process tanks the best demonstrated performance level for a similar source.

Dexter Aerospace Materials in Pittsburg, California, reported using a thermal oxidizer to reduce HAP emissions from two stationary process tanks by more than 95 percent. They use these process tanks as mixing tanks to support the application of adhesives in the manufacture of fiber composites. The thermal oxidizer was installed to comply with the requirements of the aerospace MACT standard, and emissions from the two adhesive mix tanks were manifolded to the thermal oxidizer for control. These tanks are not considered a similar source because the source is primarily a manufacturer of aerospace fiber composites covered by the aerospace MACT standard.

4.7.2 Storage Tanks

Two coatings manufacturing facilities control emissions from storage tanks. The first, PPG industries in Cleveland, Ohio, reported the best overall performance level: a HAP emission reduction of 80 percent for multiple 10,000 gal tanks venting to a thermal incinerator. However, the HAP partial pressure of the glycol ether mixture controlled is 0.02 psia. This value is below the *de minimis* of 0.05 psia that has been applied in many other rules. Therefore, we did not set the new source MACT floor based on the practices of this facility. The second facility controlling storage tanks, Torrance Coatings and Resins in Torrance, California, uses a carbon adsorber to reduce HAP emissions from several tanks by 90 percent. One tank stores glycol ethers; based on the information above, we assumed the HAP partial pressure for this tank is below the *de minimis* level. Two tanks store material that is 45 percent xylene by weight; the HAP partial pressure of this mixture could also be below the *de minimis* depending on the composition of the remaining material, which is unknown. A 25,000 gal tank storing 100 percent xylene, however, has a partial pressure of 0.11 psia, and a 20,000 gal tank storing 100 percent methyl ethyl ketone has a partial pressure of 1.5 psia (assuming a temperature of 20EC for both tanks). All of these tanks are the best performing tanks because they are all controlled to the best level of control in the source category. Applicability cutoffs are established based on the smallest tanks storing material with the lowest partial pressures (above the *de minimis*). Therefore, the MACT floor for new sources consists of 90 percent control for storage tanks with a capacity $25,000 gal that store a material with a HAP partial pressure $0.1 psia and 90 percent control for tanks with a capacity $20,000 gal and <25,000 gal that store material with a HAP partial pressure $1.5 psia.

4.7.3 Wastewater

As discussed in Section 4.6.3, combustion off-site is the control reported at the top-performing facility for wastewater streams. We determined that level of control to be comparable to the HON new source MACT floor for wastewater. Control requirements to meet the HON new source floor includes several options. Floor control requirements can be met using a steam stripper meeting a minimum set of design specifications or using a control device capable of meeting HAP-specific mass fraction removal (Fr) efficiency as specified in Table 9 of the HON (40 CFR 63, Subpart G).

The facility with the best overall performance level was Lilly Industries in Montebello, California. This facility reported off-site combustion treatment of a wastewater stream with a total HAP concentration of 1,600 ppmw. Thus, the performance criteria corresponding to the best performing source is a HAP concentration of 2,000 ppmw (rounded from 1,600 ppmw) or more.

4.7.4 Equipment Leaks

We ranked various LDAR programs implemented at surface coating manufacturing processes as described in Section 4.5.4. The performance criteria corresponding to the best similar source was a monthly sensory LDAR program equivalent to the bulk gasoline terminal NESHAP. Of the best performing sources in the existing source analysis, most used a monthly sensory LDAR program equivalent to that required by the bulk gasoline terminal NESHAP; one facility used an LDAR program based on using Method 21 with a leak definition of 10,000 ppmv. We consider this single facility to be not representative of the industry, whereas the 14 facilities that employ a sensory program are representative. Therefore, for the new source MACT floor, we selected a monthly sensory program.

4.7.5 Transfer Operations

For new sources, we conducted a telephone survey of facilities identified in the database to have high HAP throughput, based on the ICR responses for storage tanks. We were unable to identify any facilities that control emissions from bulk loading operations. Because we did not identify any means by which facilities are controlling emissions from such operations, we are not establishing a new source MACT floor for transfer operations.

4.8 REGULATORY ALTERNATIVES FOR COATING MANUFACTURING

We developed beyond-the-floor options for all five types of emission points at existing sources and for equipment leaks at new sources. These options are described below and summarized in Table

4-6. We did not develop beyond-the-floor options for process vessels, storage tanks, and wastewater emission points at new sources because the new source floors are already more stringent than either the floor or a beyond-the-floor option for existing sources for which costs were reasonable.

TABLE 4-6. SUMMARY OF REGULATORY ALTERNATIVES FOR COATING MANUFACTURING SOURCES

Type of source	Emission source type	Required control	Applicability cutoffs
Existing	Stationary process vessels	75 percent reduction	Capacity $250 gal
	Portable process vessels	75 percent reduction	Capacity $250 gal
	Storage tanks	IFR, EFR, or 90 percent reduction	Option 1: Tank capacity $20,000 gal and HAP partial pressure $1.9 psia, or Option 2: Tank capacity $10,000 gal and HAP partial pressure $1.9 psia
	Wastewater	Treatment and control options as in HON	HAP concentration in wastewater stream $2,000 ppmw
Existing and new	Transfer operations	75 percent reduction	Transfer of coatings with HAP content $3.0 million gal/yr with a HAP partial pressure $1.5 psia
	Equipment leaks	HON equivalent	All affected processes

For stationary process vessels, we evaluated regulatory alternatives beyond the floor based on a higher level of control, 75 percent reduction, rather than the 60 percent reduction established in the MACT floor. For portable process vessels, we evaluated the same alternative as for stationary vessels. We evaluated the 75 percent control level based on our knowledge of the predominant HAP in the industry and the emission stream characteristics from process vessels. Based on HAPs used, the 75 percent reduction is achievable with the use of condensers, and this alternative represents a cost-effective and environmentally sound strategy that results in lower secondary impacts than other strategies such as incineration.

For storage tanks, we evaluated two regulatory alternatives, both with a performance level of 90 percent (or the use of an internal floating roof or external floating roof), which is consistent with the highest performance level at an existing source. We selected a partial pressure cutoff of 1.9 psia and a tank capacity of 75 m^3 (20,000 gal) for one option because these are common cutoffs used in many other rules. We also developed a second regulatory alternative with a lower capacity cutoff of 38 m^3

(10,000 gal) and the same partial pressure cutoff of 13.1kPa (1.9 psia) because some NESHAP have required control of tanks as small as 38 m^3 (10,000 gal).

For wastewater existing sources, the beyond-the-floor option includes the same suppression and treatment requirements as the MACT floor, but the applicability cutoff was reduced from 4,000 ppmw to 2,000 ppmw. This lower concentration corresponds with the lowest concentration in a controlled wastewater stream at an existing facility in the source category, and it is one of the lowest concentrations in any wastewater stream in the source category.

For transfer operations, we developed a beyond-the-floor option for both new and existing sources that requires 75 percent control of materials with a HAP vapor pressure greater than or equal to 10.3 kPa (1.5 psia) and a HAP throughput greater than or equal to 11.4 million l/yr (3.0 million gal/yr). Emissions from bulk loading exhibit the same characteristics as emissions from the transfer of materials in process vessels (i.e., they result from displacement of gases during filling and are assumed to be saturated emission streams that can be effectively controlled using condensers). The 75 percent control requirement is achievable using condensers on these streams. Therefore, we developed this regulatory alternative for stationary process vessels so that the facility could use the same control for both types of emission points.

For equipment leaks, the beyond-the-floor option for both new and existing sources is the HON LDAR program. This program is the most stringent program in practice.

4.9 REFERENCES FOR CHAPTER 4

1. Memorandum from C. Zukor and R. Howle, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. May 20, 1999. Existing Source MACT Floors for Batch and Continuous Chemical Manufacturing Processes Covered by the MON.

2. Memorandum from C. Zukor and R. Howle, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. June 7, 1999. New Source MACT Floors for Batch and Continuous Chemical Manufacturing Processes Covered by the MON.

3. Memorandum from C. Zukor and R. Howle, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. June 7, 1999. New Source MACT Floors for Surface Coating Manufacturing Processes.

4. Memorandum from C. Zukor and R. Howle, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. June 22, 1999. Existing Source MACT Floors for Surface Coating Manufacturing Processes.

5. Memorandum from C. Zukor and R. Howle, Alpha Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. July 27, 1999. National Impacts Associated with Regulatory Options for MON Chemical Manufacturing Processes.

6. Memorandum from C. Zukor, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. August 20, 1999. National Impacts Associated with Regulatory Options for MON Coatings Manufacturing Processes.

7. Memorandum from D. Randall and J. Fields, MRI, to Project File. February 15, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Storage Tanks at Coatings Manufacturing Facilities.

8. Memorandum from B. Shine, North State Engineering, Inc., to Project File. March 8, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Transfer Operations at Coatings Manufacturing Facilities.

9. Memorandum from B. Shine, North State Engineering, Inc., to D. Randall. March 1, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Wastewater at Coatings Manufacturing Facilities.

10. Memorandum from D. Randall and D. Lincoln, MRI, to Project File. March 8, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Process Vessels at Coatings Manufacturing Facilities.

11. Memorandum from D. Randall, MRI, to Project File. March 13, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Equipment Leaks at Coatings Manufacturing Facilities.

12. Memorandum from D. Randall and J. Fields, MRI, to Project File. December 10,1999 (Revised May 17, 2000). MACT Floor, Regulatory Alternatives, and Nationwide Impacts for Wastewater at Chemical Manufacturing Facilities.

13. Memorandum from J. Fields, B. Shine, and D. Randall, MRI, to Project File. June 2, 2000. Determination of TRE, MACT Floor, and Control Costs for Continuous Process Vents at Chemical Manufacturing Facilities.

14. Memorandum from D. Randall and J. Fields, MRI, to Project File. July 31, 2000. MACT Floor, Regulatory Alternatives, and Nationwide Impacts for Storage Tanks at Chemical Manufacturing Facilities.

15. Memorandum from B. Shine, North State Engineering, Inc., to Project File. July 31, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Equipment Leaks at Chemical Manufacturing Facilities.

16. Memorandum from B. Shine, North State Engineering, Inc., and J. Fields, MRI, to Project File. July 31, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Batch Process Vents at Chemical Manufacturing Facilities.

5.0 SELECTION OF THE STANDARDS

5.1 SUMMARY OF THE PROPOSED EMISSION LIMITATIONS AND WORK PRACTICE STANDARDS FOR MISCELLANEOUS ORGANIC CHEMICAL MANUFACTURING

We did not go beyond the MACT floor for any emission source types in this industry. A discussion of these proposed standards is provided below, along with discussions regarding alternative compliance strategies.

5.1.1 Process Vents

For batch process vents, the proposed emission limitation for existing sources would require you to reduce uncontrolled HAP emissions from the sum of all batch process vents within the process by 98 percent if uncontrolled emissions exceed 4,540 kilograms per year (kg/yr) (10,000 pounds per year [lb/yr]). No control of vents would be required for processes that are limited to uncontrolled emissions of 4,540 kg/yr (10,000 lb/yr), as calculated on a rolling 365-day basis. A second control option that is being proposed for batch vents is to reduce the sum of all batch process vents within the process by 95 percent using recovery devices. An alternative standard is also provided, which requires demonstrating specified outlet concentrations of 20 parts per million by volume (ppmv) for combustion devices, and 50 ppmv for noncombustion devices for total organic compounds (TOC) or total organic HAP on a continuous basis. The alternative standard also would require continuous demonstration that the outlet concentration of total hydrogen halides and halogens is less than 20 ppmv for combustion devices and less than 50 ppmv for noncombustion devices. All concentrations must be corrected for the presence of supplemental gases.

For continuous process vents, the proposed emission limitations for existing sources would require control of vents determined to have a total resource effectiveness (TRE) index equal to or less than 2.6. Options include recovering sufficient HAP from the emission stream so that the TRE is maintained above 2.6, reducing HAP emissions by at least 98 percent by weight if the TRE of the outlet gaseous stream after the last recovery device is less than 2.6, or complying with the same alternative standard described above for batch process vents. For continuous process vents, we reference the process vent standards contained in 40 CFR part 63, subpart SS of the Generic MACT.

For both continuous and batch process vents, compliance with the emission limitations also may be demonstrated by combusting streams in hazardous waste incinerators that comply with the requirements of the Resource Conservation and Recovery Act (RCRA) or in boilers, flares, or process heaters that meet certain design and operating requirements. We defined the term "process" to include all equipment which collectively functions to produce a material or family of materials that are covered by the source category.

The proposed new source standards for batch and continuous process vents follow the same formats as described above. However, the applicability triggers are more stringent. All batch vents within a process for which the uncontrolled emissions from batch vents exceed 1,360 kg/yr (3,000 lb/yr) must be controlled. All continuous process vents with a TRE of less than or equal to 5.0 must be controlled. The same options for control using hazardous waste incinerators, other combustion devices, and the alternative and concentration standards are also available for new sources.

5.1.2 Storage Tanks

We are proposing emission limitations and work practice standards for storage tanks that would require existing sources to control emissions from storage tanks having capacities greater than or equal to 38 cubic meters (m^3) (10,000 gallons [gal]) and storing material with a HAP partial pressure of greater than 6.9 kilopascals (kPa) (1.0 pound per square inch absolute [psia]). For new sources, the proposed standards would require control of storage tanks having capacities greater than or equal to 38 m^3 (10,000 gal) and storing material with a HAP partial pressure of greater than 0.7 kPa (0.1 psia). For both existing and new sources, the required control would be to use a floating roof or to reduce the organic HAP emissions by 95 percent by weight or more. Another option is to comply with the alternative standard as described above for process vents.

5.1.3 Wastewater

The proposed standards for wastewater are identical to those required under the HON. At existing sources, control would be required for wastewater streams with HAP listed on Table 9 of 40

CFR part 63, subpart G in the HON (Table 9 HAP) if the concentration exceeds 1,000 parts per million by weight (ppmw) and the flow exceeds 10 liters per minute (lpm), or if the concentration of Table 9 HAP exceeds 10,000 ppmw at any flowrate. The proposed control requirements are to convey the wastewater streams through controlled sewers using vapor suppression techniques to treatment where the Table 9 HAP are removed or destroyed, thereby reducing Table 9 HAP emissions. At new sources, the proposed conveyance and control requirements are identical to those for existing sources, but the applicability triggers on individual streams are more stringent. In addition to controlling streams that meet the thresholds for existing sources, control would also be required for streams containing HAP on Table 8 of 40 CFR part 63, subpart G of the HON (Table 8 HAP) if the concentration exceeds 10 ppmw and the wastewater stream flowrate is greater than 0.02 lpm.

5.1.4 Transfer Operations

For transfer operations, we are proposing to require the HON level of control for transfer racks that load greater than 0.65 million liters per year (l/yr) (0.17 million gallons per year [gal/yr]) of liquid products that contain organic HAP with a partial pressure of 10.3 kPa (1.5 psia). These requirements apply only to bulk loading operations. Each transfer rack that meets these thresholds would be required to be controlled to reduce emissions of total organic HAP by 98 percent by weight or more or to have displaced vapors returned to the process or originating container.

5.1.5 Equipment Leaks

For equipment leaks, we are proposing to require implementation of the leak detection and repair (LDAR) program that is contained in the Generic MACT (40 CFR part 63, subpart UU). This LDAR program is also essentially the same as the program in the Consolidated Air Rule (40 CFR, Part 65). This LDAR program achieves the same reductions as the HON LDAR program, but contains options for more directed monitoring of components that have been identified to leak, thereby reducing the monitoring burden relative to that of the HON LDAR program.

5.1.6 Miscellaneous

Several other sources and implementation options are addressed in the MON, consistent with other MACT standards. The MON contains provisions for compliance through emissions averaging and through the demonstration of reductions from pollution prevention. Additionally, the MON contains provisions that require owners and operators to monitor and repair leaking heat exchangers, and to develop a plan for minimizing emissions from maintenance wastewater. All of these provisions are discussed in the following subsections.

5.1.6.1 Emission Averaging. The proposed subpart FFFF includes identical provisions for emission averaging as have been included in other MACT standards such as the HON. These provisions allow you the option to claim credit on emission points that are controlled beyond what is required by the MACT standards and apply these credits to reductions required on other emission points to achieve overall compliance. As with other standards, the emissions averaging provisions contain several restrictions on their use, including a limit on the number of points allowed in the average, a prohibition from claiming credit in the average for any emission sources that are required to be controlled because of other state or federal rules or for emission sources that have been permanently shut down.

5.1.6.2 Pollution Prevention. The proposed subpart FFFF also includes a pollution prevention alternative for existing sources that meets the control level of the MACT floor and that may be implemented in lieu of the emission limitations described above. The pollution prevention alternative provides a way for facilities to comply with MACT by reducing overall consumption of HAP in their processes; therefore, it is not applicable for HAP that are generated in the process. Specifically, you must demonstrate that the production-indexed consumption of HAP has decreased by at least 65 percent from a 3-year average baseline set no earlier than the 1994 through 1996 calendar years. The production-indexed consumption factor is expressed as the mass of HAP consumed divided by the mass of product produced. The numerator in the factor is the total consumption of the HAP, which describes all the different areas where it can be consumed, either through losses to the environment, consumption in the process as a reactant, or otherwise destroyed. This pollution prevention alternative is not available for continuous process vents because pollution prevention is already incorporated in the standard for continuous process vents by having the TRE applied after the last recovery device.

5.1.6.3 Work Practice Standards. The proposed subpart FFFF contains several work practice standards. For maintenance wastewater, the proposed subpart requires the owner to prepare and implement a plan for minimizing emissions according to the provisions of §63.105 of the HON.

Work practice standards are also proposed for monitoring of heat exchange systems according to the provisions of §63.104 of the HON, and for the monitoring of leaks and bypasses from closed vent systems that are used to carry emissions from emission sources to control devices.

5.2 SUMMARY OF THE PROPOSED EMISSION LIMITATIONS AND WORK PRACTICE STANDARDS FOR MISCELLANEOUS COATING MANUFACTURING

5.2.1 Process Vents

The proposed standards require both stationary and portable process vessels with capacities greater than or equal to 0.94 m^3 (250 gal) to be equipped with covers. Additionally, the vented organic HAP emissions from the covered stationary vessels at existing sources must be reduced by at least 75 percent by weight. Stationary and portable vessels at new sources would be required to be equipped with covers, and the vented organic HAP emissions must be reduced by at least 95 percent by weight. Another proposed option is to vent organic HAP emissions to a condenser operating at a specified temperature that is related to the partial pressure of the HAP in the process vessel.

5.2.2 Storage Tanks

The proposed standards for affected storage tanks at both existing and new sources would require either organic HAP emissions reductions of 90 percent by weight or more or the use of floating roofs. For existing sources, affected storage tanks are those that have capacities greater than or equal to 75 m^3 (20,000 gal) and store material with a vapor pressure of 13.1 kPa (1.9 psia). For new sources, affected storage tanks are those with capacities equal to or greater than 75 m^3 (20,000 gal) but less than 94 m^3 (25,000 gal) and storing material that has a vapor pressure of 10.3 kPa (1.5 psia) or greater, and tanks with capacities greater than 94 m^3 (25,000 gal) storing material that has a vapor pressure of 0.7 kPa (0.1 psia).

5.2.3 Wastewater

For wastewater at existing sources, the proposed NESHAP would require that wastewater containing a total Table 9 HAP (of 40 CFR part 63, subpart G) concentration of 4,000 ppmw or greater be conveyed in controlled sewers and treated to remove or destroy organic HAP. The compliance procedures cross referenced from the HON allow for offsite control of wastewater provided the offsite source submits to EPA written certification that they will manage and treat any affected wastewater or residual in accordance with the requirements of the proposed rule. For new sources, the applicability triggers for control would be more stringent, affecting all streams with Table 9 HAP concentrations greater than or equal to 2,000 ppmw.

5.2.4 Transfer Operations

Proposed standards for transfer operations at both new and existing sources would require 75 percent control of all product loading operations that load material with at least 11.4 million l/yr (3.0 million gal/yr) of HAP with a HAP partial pressure greater than or equal to 10.3 kPa (1.5 psia). Acceptable control strategies also include routing displaced vapors back to the process. The requirements apply only to bulk loading operations.

5.2.5 Equipment Leaks

As with the standards for miscellaneous organic chemical manufacturing, we are proposing to require the LDAR program contained in the Generic MACT (40 CFR part 63, subpart UU) for control of equipment leaks at both existing and new sources.

5.2.6 Miscellaneous

For maintenance wastewater and heat exchanger systems, as in subpart FFFF, we are proposing to require a work practice standard to develop a plan for minimizing emissions from maintenance wastewater according to the provisions of §63.105 of the HON, and we are proposing to require a periodic (monthly or quarterly) leak detection program to identify and repair leaking heat exchangers according to the provisions of §63.104 of the HON.

5.3 USE OF GENERIC MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY STANDARDS

We have referenced the requirements of the Generic MACT standards (Subpart SS for process vents, UU for equipment leaks) to maintain consistency with other MACT standards. These existing standards reflect the current Agency positions that have been developed through numerous rulemaking efforts. The Generic MACT compliance provisions for certain sources (fired sources such as boilers and process heaters) also closely follow requirements contained in the NSPS and therefore owners and operators of miscellaneous coatings facilities may also have some familiarity for these type of sources. In the interest of streamlining requirements for Title V permits, using these existing provisions may also provide opportunities for condensing identical or similar requirements.

5.4 RATIONALE FOR SELECTION OF PROPOSED STANDARDS FOR NEW AND EXISTING SOURCES

We selected the proposed standards for both source categories based on our evaluation of the floors and regulatory alternatives. When evaluating the more stringent options, we consider the costs, non-air quality health and environmental impacts, and energy requirements that accompany the expected emission reductions. This rationale is discussed below.

5.4.1 Organic Chemical Manufacturing

The proposed standards for equipment leaks and transfer operations at both new and existing sources, and the standards for process vents and storage tanks at new sources, are based on the MACT floor because no beyond-the-floor option was developed. When a beyond-the-floor option was developed (i.e., for process vents and storage tanks at existing sources and wastewater at both new and existing sources), we evaluated the cost effectiveness of the option and the incremental cost of going beyond the MACT floor. Table 5-1 presents a summary of costs and estimated impacts for the MACT floors and regulatory alternatives described above.

For continuous process vents at existing sources, we concluded that the total impacts of the above-the-floor option would be unreasonable in light of the HAP emission reductions achieved. Specifically, the incremental HAP reduction achieved by the above-the-floor option is 50 Mg/yr, and the incremental cost is $61,000/Mg of HAP controlled. The incremental electricity consumption to operate exhaust gas fans is 3.5 million kwh/yr (an average increase of 58,000 kwh/yr for an estimated 60 facilities with additional vents subject to control under the above-the-floor option). The incremental steam consumption for steam-assist flares is 45 million lb/yr (about 750,000 lb/yr/facility). The incremental fuel energy for natural gas (to operate incinerators and flares and to generate steam) and coal to generate the electricity is about 500 billion Btu/yr (about 8.3 billion Btu/yr/facility). Total CO, NO_x, and SO_2 emissions from the combustion of these fuels would increase by about 66 Mg/yr. There would be no wastewater or solid waste impacts. We concluded that the total impacts of the above-the-floor option would be unreasonable compared to the HAP emissions reductions achieved.

Therefore, the proposed standard for continuous process vents at existing sources is based on the MACT floor.

TABLE 5-1. SUMMARY OF IMPACTS OF REGULATORY ALTERNATIVES FOR MISCELLANEOUS ORGANIC CHEMICAL MANUFACTURING

Emission source type	Regulatory alternative	Total capital cost, $	Total annual cost, $/yr	Emission reduction, Mg/yr	Incremental cost, $/Mg		Increase in secondary air emissions, Mg/yr	Increase in electricity use, 10^6 kwh/yr	Increase in steam use, 10^6 lb/yr	Increase in total fuel use, 10^9 Btu/yr
					Relative to baseline	Relative to MACT floor				
Continuous process vents	MACT floor	29,200,000	30,700,000	3,310	9,300	N/A	838	51.7	366	5,390
	Regulatory alternative	32,260,000	33,700,000	3,360	10,000	61,200	906	55.2	411	5,890
Batch process vents	MACT floor	25,340,000	16,510,000	6,290	2,381	N/A	344	21.3	175	2,210
	Regulatory alternative	28,650,000	18,658,468	6,435	2,630	14,800	411	26.4	181	2,560
Storage tanks	MACT floor	6,000,000	2,030,000	262	7,700	N/A	0.86	0.10	0	1.0
	Regulatory alternative	7,420,000	2,600,000	292	8,900	19,000	0.98	0.12	0	1.1
Wastewater	MACT floor	47,000,000	16,900,000	4,380	3,860	N/A	85	2.85	504	773
	Regulatory alternative	63,400,000	22,730,000	4,780	4,760	14,600	119	3.98	705	1,080
Equipment leaks	MACT floor	14,100,000	9,320,000	13,800	675	N/A	0	0	0	0

For batch process vents at existing sources, we also concluded that the total impacts of the above-the-floor option would be unreasonable in light of the HAP emissions reductions achieved. The incremental HAP reduction achieved by the above-the-floor option is 145 Mg/yr, and the incremental cost is $15,000/Mg of HAP controlled. The incremental electricity consumption to operate exhaust gas fans is 5.1 million kwh/yr (an average increase of 135,000 kwh/yr for an estimated 38 facilities with additional vents subject to control under the above-the-floor option). The incremental steam consumption for steam-assist flares is 6.0 million lb/yr (about 160,000 lb/yr/facility). The incremental fuel energy for natural gas (to operate incinerators and flares and to generate steam) and coal to generate the electricity is about 340 billion Btu/yr (about 9.0 billion Btu/yr/facility). Total CO, NO_x, and SO_2 emissions from the combustion of these fuels would increase by about 66 Mg/yr. There would be no wastewater or solid waste impacts. We concluded that the total impacts of the above-the-floor option would be unreasonable compared to the HAP emissions reductions achieved. Therefore, the proposed standard for batch process vents at existing sources is based on the MACT floor.

We reached a similar conclusion for storage tanks at existing sources. For such storage tanks, the incremental HAP reduction achieved by the above-the-floor option is 30 Mg/yr, and the incremental cost is $19,000/Mg of HAP controlled. The incremental electricity and fuel consumption rates for storage tanks controlled with condensers at existing sources are 15,000 kwh/yr and 145 million Btu/yr, respectively (about 1,500 kwh/yr/tank and 14.5 million Btu/yr/tank, respectively); there would be no environmental impacts or energy requirements for other storage tanks controlled with floating roofs. The total CO, NO_x, and SO_2 emissions from fuel combustion would increase by only about 0.1 Mg/yr. We concluded that the total impacts of the above-the-floor option would be unreasonable in light of the HAP emissions reductions achieved. Therefore, the proposed standard for storage tanks at existing sources is based on the MACT floor.

Finally, we concluded that the total impacts of the above-the-floor for wastewater at existing sources would be unreasonable compared to the HAP emissions reductions achieved. For wastewater, the incremental HAP reduction for the above-the-floor option is 400 Mg/yr, and the incremental cost is about $15,000/Mg of HAP controlled. Additional wastewater streams at 24 existing facilities would be subject to the treatment requirements under the above-the-floor option. The incremental electricity and steam consumption rates to comply with these requirements are about 1.1 million kwh/yr and 200 million lb/yr, respectively (about 47,000 kwh/yr/facility and 8.3 million lb/yr/facility, respectively). Incremental fuel consumption to generate the electricity and steam is about 300 billion Btu/yr (13 billion Btu/yr/facility). Total CO, NO_x, and SO_2 emissions from the fuel combustion would increase by 33 Mg/yr. We concluded that the total impacts for the above-the-floor option for existing sources would be unreasonable. Therefore, the proposed standard for wastewater at existing sources is based on the MACT floor.

For wastewater at new sources, the differences between the above-the-floor option and the MACT floor are the same as for existing sources. Therefore, we also concluded that the incremental impacts of the above-the-floor option for new sources would be unreasonable, and the proposed standard for wastewater at new sources is based on the MACT floor.

5.4.2 Coating Manufacturing

For the Miscellaneous Coating Manufacturing source category, we decided to propose the regulatory alternatives identified as above the floor for stationary process vessels at existing sources, storage tanks at existing sources, and transfer operations and equipment leaks at both new and existing sources. In these cases, we found that the incremental costs and non-air quality environmental impacts and energy requirements of going above the MACT floors are acceptable. By contrast, for portable process vessels at existing and new sources, storage tanks at new sources, and wastewater at new sources, we are proposing standards based on the MACT floor because we determined that either the MACT floor itself is based on a very high level of control or the MACT floor requirements are more stringent than existing source regulatory alternatives for which incremental costs and other impacts were not acceptable. Similarly, for wastewater at existing sources, we are proposing standards based on the MACT floor because we determined that the incremental costs and other impacts to go above the MACT floor were not acceptable.   Table 5-2 presents a summary of costs and estimated impacts for the MACT floors and regulatory alternatives described above.

For stationary process vessels at existing sources, we concluded that the total impacts of the above-the-floor option were reasonable. For such stationary process vessels, we found that going from the cover plus a 60 percent control device to the cover plus a 75 percent control device reduces HAP emissions by nearly 1,700 Mg/yr and reduces annual costs by $80/Mg of HAP controlled. Assuming the control levels for both the MACT floor and the above-the-floor option are achieved using condensers, incremental electricity consumption is about 2.7 million kwh/yr (an average increase of approximately 22,000 kwh/yr per facility). To generate this electricity, fuel consumption (coal) is estimated to increase by 26.6 billion Btu/yr, and total CO, NO_x, and SO_2 emissions are estimated to increase by 23 Mg/yr. There would be no wastewater or solid waste impacts. Thus, we selected the regulatory alternative as the proposed standard for stationary vessels at existing sources. The proposed standard for stationary vessels at new sources is based on the MACT floor, which consists of a cover and an add-on control device that

TABLE 5-2. SUMMARY OF IMPACTS OF REGULATORY ALTERNATIVES FOR COATINGS MANUFACTURING

Emission source type	Regulatory alternative	Total capital cost, $	Total annual cost, $/yr	Emission reduction, Mg/yr	Incremental cost, $/Mg		Increase in secondary air emissions, Mg/yr	Increase in electricity use, 10^6 kwh/yr	Increase in steam use, 10^6 lb/yr	Increase in total fuel use, 10^9 Btu/yr
					Relative to baseline	Relative to MACT floor				
Portable process vessels	MACT floor	650,000	97,800	2.2	44,900	N/A	0	0	0	0
	Regulatory alternative	31,600,000	9,310,000	445	20,900	20,800	7.9	0.94	0	9.18
Stationary process vessels	MACT floor	54,200,000	14,300,000	3,360	4,260	NA	11.0	1.31	0	12.8
	Regulatory alternative	55,100,000	14,170,000	5,050	2,550	(80)	34.0	4.04	0	39.4
Storage tanks	MACT floor	0	0	0	N/A	N/A	0	0	0	0
	Regulatory alternative 1	62,200	12,300	2.53	4,900	4,900	0	0	0	0
	Regulatory alternative 2	236,000	161,500	7.52	21,500	29,900	N/A	N/A	N/A	N/A
Wastewater	MACT floor	722,000	307,000	10.7	28,700	N/A	0.056	0.0018	0.33	0.51
	Regulatory alternative	1,081,000	396,000	11.1	35,700	223,000	0.076	0.0025	0.45	0.69
Equipment leaks	MACT floor	636,000	396,000	234	1,690	N/A	0	0	0	0
	Regulatory alternative	845,000	1,390,000	598	2,320	2,700	0	0	0	0
Transfer operations	MACT floor	0	0	0	0	N/A	0	0	0	0
	Regulatory alternative	12,439	95,352	37.2	2,566	2,566	0.018	0.0022	0	0.021

reduces HAP emissions by at least 95 percent because, as described above, we did not develop a more stringent option.

For portable process vessels at existing sources we concluded that the total impacts of the above-the floor option were unreasonable in light of the HAP emissions reductions achieved. Specifically, going from the MACT floor (a cover) to a cover plus a control device achieving 75 percent reduction reduces HAP emissions by about 440 Mg/yr. Assuming the control device is a condenser, the incremental cost is approximately $21,000/Mg of HAP controlled. In addition, electricity consumption to operate refrigeration units would increase from zero at the MACT floor to more than 900,000 kwh/yr (an average increase of about 11,000 kwh/yr/facility for an estimated 85 facilities with portable process vessels subject to additional control under the above-the-floor option).

Fuel consumption (coal) to generate the electricity would increase by more than 9.0 billion Btu/yr; collectively, CO, NO_x, and SO_2 emissions would increase by 8 Mg/yr; and there would be no wastewater or solid waste impacts. We concluded that the total impacts for this option were unreasonable. Therefore, we selected the MACT floor as the proposed standard for portable process vessels at existing sources. The proposed standard for portable vessels at new sources also is based on the MACT floor, which consists of a cover and an add-on control device capable of reducing HAP emissions by at least 95 percent because, as described above, we did not develop a more stringent option.

For storage tanks at existing sources, we found the impacts of the first above-the-floor option, which requires control of tanks greater than or equal to 75 m^3 (20,000 gal) storing material with a vapor pressure greater than or equal to 13.1 kPa (1.9 psia), to be reasonable compared to the HAP emissions reductions achieved. This option reduces emissions by 2.5 Mg/yr at an incremental cost of $2,700 to $4,900 per Mg of HAP controlled, depending on the characteristics of the tanks. In addition, because the above-the-floor option can be achieved using floating roofs, there are no non-air quality environmental impacts or energy requirements. However, we found the second option, which would have required control of all tanks having a capacity of at least 38 m^3 at the same vapor pressure applicability cutoff, has incremental costs between $17,000 and $30,000 per Mg of HAP controlled, depending on the characteristics of the tanks. There would also be increased non-HAP environmental impacts and energy requirements to operate condensers to control emissions from the tanks with capacities between 38 m^3 and 75 m^3; we did not quantify these impacts. Therefore, we selected the option that requires control of tanks with capacities greater than or equal to 75 m^3 storing material with a vapor pressure greater than or equal to 1.9 psia as the proposed standard for storage tanks at existing sources. By contrast, the proposed standard for storage tanks at new sources is based on the MACT floor because, as described above, we did not develop a more stringent option.

For wastewater at existing sources we concluded that the impacts of the above-the-floor regulatory option were unreasonable compared to the HAP emissions reductions achieved. For wastewater at existing sources, the above-the-floor regulatory option is the control of all streams with a total HAP concentration greater than 2,000 ppmw (the MACT floor was 4,000 ppmw). For the impacts analysis, we assumed that the required treatment would be achieved using a steam stripper or by sending the wastewater offsite for treatment, depending on the quantity generated. We estimated that the above-the-floor option would require treatment by one additional facility and reduce HAP emissions by less than 0.5 Mg/yr at an incremental cost of more than $200,000/Mg of HAP controlled. In addition, electricity consumption would increase by about 700 kwh/yr; steam consumption would increase by 120,000 lb/yr; energy to generate the electricity and steam would increase by 180 million Btu/yr; and total CO, NO_x, and SO_2 emissions would increase by 0.02 Mg/yr. There may also be solid waste impacts if condensed steam and pollutants from the steam stripper cannot be reused. We concluded that the total impacts for the above-the-floor option were unreasonable. Therefore, we are proposing that the standard for wastewater at existing sources be based on the MACT floor. The proposed standard for wastewater at new sources is also based on the MACT floor (i.e, the HON suppression and treatment requirements for all streams with a total HAP concentration greater than 2,000 ppmw) because, as described above, we did not develop a more stringent option.

For transfer operations, we found that the total impacts of the above-the floor option were reasonable in light of the HAP emissions reductions achieved. Specifically, the above-the-floor option would reduce HAP emissions by about 37 Mg/yr at an incremental cost of less than $3,000/Mg of HAP controlled. In addition, under the above-the-floor option, operation of a refrigeration unit at one existing facility would increase electricity consumption by about 2,150 kwh/yr; increase energy consumption by 21 million Btu/yr; and increase total CO, NO_x, and SO_2 emissions by less than 0.02 Mg/yr. There would be no non-air environmental impacts. We concluded that the total impacts for the above-the-floor option were reasonable. Therefore, for both new and existing sources, we are proposing that the emission limitation be based on the above-the-floor option which would require at least 75 percent control of HAP emissions from bulk loading of products with a HAP throughput greater than or equal to 11.4 million l/yr (3.0 million gal/yr) and a weighted HAP partial pressure greater than or equal to 10.3 kPa (1.5 psia).

For equipment leaks, our model analysis indicates that implementing an above-the-floor option consisting of a HON-equivalent LDAR program instead of the sensory program determined to be the floor would reduce HAP emissions by 360 Mg/yr at an incremental cost of $2,700/Mg of HAP controlled. In addition, there are no environmental impacts or energy requirements associated with implementing the above-the-floor option. We concluded that the total impacts for the above-the-floor option were reasonable. Therefore, we are proposing that the standard for equipment leaks for both existing and new sources be based on the LDAR program in the Generic MACT (40 CFR part 63, subpart UU), which is comparable to the HON LDAR program.

5.5 SELECTION OF COMPLIANCE DEMONSTRATION REQUIREMENTS

5.5.1 Initial Compliance and Performance Tests

Most of the testing and initial compliance demonstration provisions contained in the NESHAP are based on the requirements contained in the HON for wastewater sources; the Generic MACT for continuous process vents, transfer operations, equipment leaks, and storage tanks; and the Pharmaceuticals Production NESHAP for batch process vents and coatings process vessels. In addition, the TRE for continuous process vents is determined using procedures in the HON, and compliance with the emissions averaging provisions is demonstrated using procedures in the HON. Procedures for demonstrating compliance with the alternative standard for both continuous and batch process vents, the vapor balancing alternative for storage tanks, and the pollution prevention standard for miscellaneous organic chemical manufacturing sources are consistent with procedures in the Pharmaceuticals Production NESHAP.

To comply with an emission limitation, most initial demonstrations of compliance are structured to account for the most challenging conditions to which a control device will be exposed. The initial compliance demonstration is also tied to the continuous compliance demonstration in that an operating parameter is used as an indicator of the control device's performance over time, and the operating parameter is first "calibrated" against the control efficiency achieved by the device during the initial compliance demonstration. Therefore, the initial compliance demonstration must be conducted at the most challenging conditions in order to ensure continuous compliance under all other conditions.

Initial compliance demonstrations for flares consist of flare compliance assessments as specified in 40 CFR, Part 63, subpart SS. For other control devices, initial compliance demonstrations consist of either design evaluations or performance tests. Performance tests are required for control devices controlling at least 9.08 Mg/yr (10 tons/yr) HAP that are used to control batch vents, and for control devices used to control continuous process vents that have TRE values below the applicable threshold. Design evaluations may be used for the initial compliance demonstrations in other circumstances.

The proposed NESHAP allow owners and operators to use either Method 25, 25A (under certain specific conditions), or 18 to demonstrate compliance with the HAP percent emission reduction requirement. However, if Method 18 is used, only HAP that are present in the inlet to the device can be used to characterize the percent reduction across the device. Additionally, HAP that are present in the inlet gas stream (i.e., uncontrolled emissions) must be determined using process knowledge or a screening procedure. When using Method 25 or 25A, you must measure the inlet and outlet mass emissions as carbon. In demonstrating compliance with the outlet concentration standard, Method 18 or Method 25A may be used. If Method 18 is used, the resulting concentration must be reported as the compound or compounds measured; however, if Method 25A is used, the concentration must be reported as carbon.

Initial compliance with the pollution prevention alternative is accomplished by documenting that the required reduction in the production-indexed consumption factor can be achieved and that the facility has measurement systems in place to adequately demonstrate these reductions on an ongoing basis.

5.5.2 Monitoring

Monitoring is required by the proposed NESHAP to determine whether a source is in compliance on an ongoing basis. We selected the continuous compliance requirements based on a combination of general monitoring requirements in the General Provisions (subpart A) and specific monitoring requirements for the HON, Generic MACT, and Pharmaceuticals Production source categories.

5.5.2.1 General Monitoring Requirements. As specified in §63.8(c) of the General Provisions, sources must record the data from their monitoring systems at least once every 15 minutes. However, for control devices that are determined to control less than 0.91 Mg/yr (1 ton/yr) of HAP, the proposed MACT standards require only a daily verification that the devices are operating as required, consistent with the referenced Pharmaceuticals Production NESHAP.

Sources would be required to calculate either daily or block averages of their operating parameter values for the purpose of ensuring continuous compliance. We selected the daily or block averaging times referenced in the Pharmaceuticals Production NESHAP again following consistency with the initial compliance demonstration.

5.5.2.2 Continuous Monitoring. When determining appropriate monitoring options, we consider the availability and feasibility of the following strategies in a "top-down" approach: (1) CEMS for the actual HAP emitted, (2) CEMS for HAP surrogates, (3) monitoring operating parameters, and (4) work practice standards. In evaluating the use of CEMS in these standards, monitoring of individual HAP species may not be reasonable or technically feasible for many streams. For those cases where it is feasible, CEMS meeting Performance Specification 9 or 15 may be used to measure and report emissions as individual HAP compounds. However, in the case of continuous monitoring of surrogates, continuous TOC monitoring is considered a viable and efficient monitoring option and is provided in these proposed NESHAP. The alternative standard makes use of CEMS that meet Performance Specification 8 that have been calibrated using the predominant HAP in the stream. The results must be reported as carbon when compared to the 20 ppmv emission limit for combustion devices or 50 ppmv emission limit for noncombustion devices. To monitor HCl emissions, you must either use a CEMS that meets Performance Specification 15, or if you wish to use a CEMS for which we have not promulgated a Performance Specification, you must prepare a monitoring plan and submit it for approval in accordance with the procedures specified in §63.8 of the General Provisions. The requirement to submit a monitoring plan for approval is an interim solution that is necessary until we promulgate applicable Performance Specifications.

Monitoring of control device operating parameters is considered appropriate for many other emission sources, and therefore, most of the other monitoring options provided in the proposed NESHAP are based on parametric monitoring. Based on information from the source categories, we selected operating parameters for the following types of control devices that are reliable indicators of control device performance: thermal and catalytic incinerators, flares, carbon adsorbers, scrubbers, and condensers. In general, we selected parameters and monitoring provisions that are contained in the HON and in the Pharmaceuticals Production NESHAP. The range of parameter limits in both standards should cover both batch and continuous production processes. Sources would monitor these operating parameters to demonstrate continuous compliance with the emission limits and operating limits.

5.5.2.3 Other Monitoring. Approval for alternative monitoring is accomplished according to the procedures in subpart A, §63.8, or in the initial precompliance report. The proposed NESHAP also contain monitoring for work practice standards involving periodic inspections for equipment integrity. These monitoring requirements include storage tank seal inspections, wastewater system component inspections, and CVS bypass and closure device inspections and are also required by HON and Pharmaceutical MACT standards.

5.5.3 Recordkeeping Requirements

The proposed NESHAP require you to maintain a copy of each notification and report, as well as documentation supporting any initial notification or notification of compliance status, according to the requirements in §63.10(b)(1)(xiv). You must also keep the records in §63.6(e)(3) related to startup, shutdown, and malfunction; records of performance tests and performance evaluations, as required in §63.7(g)(1); and records for each CEMS and parameter monitoring systems.

The records for the CEMS would include the records described in §63.10(b)(vi) through (xi), superseded versions of the performance evaluation plan, as required in §63.7(d)(3), and the request for alternatives to a relative accuracy test for CEMS, as required in §63.8(f)(6)(i). The records for the parameter monitoring system would include records of operating limits and parameter monitoring data. You must keep records of all material balances and calculations documenting the percent reduction in HAP emissions used to demonstrate compliance with the emission limitations.

5.5.4 Reporting

The notification requirements in the proposed NESHAP include initial notifications, notification of performance test, notification of compliance status, and notification dates. These notification requirements are based on requirements in §§63.6(h); 63.7(b) and (c); 63.8(e) and (f); 63.9(b), (f), and (h); and 63.10(d)(2) of the General Provisions.

The reporting requirements that we selected include semiannual compliance reports, required in §63.10(e)(3), and immediate startup, shutdown, and malfunction reports, required in §63.10(d)(5)(ii).

5.6 REQUIREMENTS OF OTHER REGULATIONS AND STANDARDS

5.6.1 General Provisions

As with other MACT standards, these proposed standards contain a tabular listing of general provisions requirements that apply.

5.6.2 Operating Permit Program

Title V requires operating permits to assure compliance with all applicable requirements at a source, including the proposed standards. Most existing sources that will become subject to the proposed standards upon promulgation will already be operating under Title V operating permits (e.g., because they are major sources of HAP or because they are subject to some other section 112 standard).

Under section 502(b)(9) of the CAA, if a federal standard like the proposed standards is promulgated when 3 or more years remain on a major source's Title V permit term, the permit will need to be reopened in order to assure compliance with the proposed subpart FFFF. Such a reopening must be completed not later than 18 months after promulgation of the proposed standards. See generally 40 CFR 70.7(f)(1)(i).

If fewer than 3 years remain on a Title V permit term, a permitting authority's program may reflect the option not to require revisions to the permit to incorporate the standard. Subpart requirements would be added to the source's Title V permit at the next permit renewal, but of course in the meantime the source must fully comply with the standards outside the Title V permit. The CAA permits State programs to require revisions to the permit to incorporate the standard when fewer than 3 years remain on a major source's permit term, however, so any sources with fewer than 3 years remaining on their permits upon the promulgation of the proposed standards should consult their State permitting program regulations to determine whether revision to their permits is necessary to incorporate the standard.

5.7 REFERENCES FOR CHAPTER 5

1. Memorandum from C. Zukor and R. Howle, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. May 20, 1999. Existing Source MACT Floors for Batch and Continuous Chemical Manufacturing Processes Covered by the MON.

2. Memorandum from C. Zukor and R. Howle, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. June 7, 1999. New Source MACT Floors for Batch and Continuous Chemical Manufacturing Processes Covered by the MON.

3. Memorandum from C. Zukor and R. Howle, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. June 7, 1999. New Source MACT Floors for Surface Coating Manufacturing Processes.

4. Memorandum from C. Zukor and R. Howle, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. June 22, 1999. Existing Source MACT Floors for Surface Coating Manufacturing Processes.

5. Memorandum from C. Zukor and R. Howle, Alpha Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. July 27, 1999. National Impacts Associated with Regulatory Options for MON Chemical Manufacturing Processes.

6. Memorandum from C. Zukor, Alpha-Gamma Technologies, Inc., to Miscellaneous Organic NESHAP Project File. August 20, 1999. National Impacts Associated with Regulatory Options for MON Coatings Manufacturing Processes.

7. Memorandum from D. Randall and J. Fields, MRI, to Project File. February 15, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Storage Tanks at Coatings Manufacturing Facilities.

8. Memorandum from B. Shine, North State Engineering, Inc., to Project File. March 8, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Transfer Operations at Coatings Manufacturing Facilities.

9. Memorandum from B. Shine, North State Engineering, Inc., to D. Randall. March 1, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Wastewater at Coatings Manufacturing Facilities.

10. Memorandum from D. Randall and D. Lincoln, MRI, to Project File. March 8, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Process Vessels at Coatings Manufacturing Facilities.

11. Memorandum from D. Randall, MRI, to Project File. March 13, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Equipment Leaks at Coatings Manufacturing Facilities.

12. Memorandum from D. Randall and J. Fields, MRI, to Project File. December 10,1999 (Revised May 17, 2000). MACT Floor, Regulatory Alternatives, and Nationwide Impacts for Wastewater at Chemical Manufacturing Facilities.

13. Memorandum from J. Fields, B. Shine, and D. Randall, MRI, to Project File. June 2, 2000. Determination of TRE, MACT Floor, and Control Costs for Continuous Process Vents at Chemical Manufacturing Facilities.

14. Memorandum from D. Randall and J. Fields, MRI, to Project File. July 31, 2000. MACT Floor, Regulatory Alternatives, and Nationwide Impacts for Storage Tanks at Chemical Manufacturing Facilities.

15. Memorandum from B. Shine, North State Engineering, Inc., to Project File. July 31, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Equipment Leaks at Chemical Manufacturing Facilities.

16. Memorandum from B. Shine, North State Engineering, Inc., and J. Fields, MRI, to Project File. July 31, 2000. MACT floor, Regulatory Alternatives, and Nationwide Impacts for Batch Process Vents at Chemical Manufacturing Facilities.

6.0 ENVIRONMENTAL, ENERGY, COST, AND ECONOMIC IMPACTS

This chapter presents the primary air, secondary air, non-air environmental, energy, cost, and economic impacts resulting from the control of organic HAP emissions under the proposed NESHAP. Impacts are relative to a baseline reflecting the level of control in the absence of the rule and include only applying controls to major existing facilities. Information is not currently available to determine impacts on new facilities which are expected to be constructed.

We estimated impacts for existing sources by applying the controls necessary to bring each facility into compliance with the proposed NESHAP. There is no impact for a facility or emission point within a facility already in compliance with the proposed standards.

6.1 PRIMARY AIR IMPACTS

We estimate the proposed standards will reduce organic HAP emissions from all existing sources by 33,700 metric tonnes (Mg/yr) (37,000 tons/yr) from a baseline level of 52,500 Mg/yr (57,900 tons/yr). This is an overall reduction of 64 percent. Table 6-1 summarizes the reductions attributable to each type of emission point within the miscellaneous organic chemical manufacturing source category. Table 6-2 summarizes the reductions attributable to each type of emission point within the miscellaneous coating manufacturing source category.

6.2 SECONDARY AIR AND OTHER ENVIRONMENTAL IMPACTS

6.2.1 Secondary Air Impacts

Secondary air impacts of the proposed standards include increases in carbon monoxide (CO) and nitrogen oxides (NO_x) from the combustion of organic HAP and fuels in some control devices (incinerators, flares, or thermal oxidizers, for example); in the production of steam for steam strippers; and in the production of electricity for the operation of fans, pumps, and refrigeration units. Electricity production, which is based on coal combustion, will also generate emissions of sulfur dioxide (SO_2) and particulate matter (PM_{10}). Control of all emission source types except equipment leak emissions may contribute to secondary air impacts. Tables 6-3 and 6-4 summarize the secondary air impacts associated with the proposed NESHAP for the chemicals and coatings source categories, respectively. Referenced memoranda located in the Miscellaneous Organic NESHAP Project File, Docket No.:[A-96-04] contain more detailed descriptions of this analyses described in this document, including data.

TABLE 6-1. ORGANIC HAP EMISSION REDUCTIONS BY EMISSION POINT FOR EXISTING CHEMICAL MANUFACTURING SOURCES

Emission source type	Baseline emissions, Mg/yr	Emissions after compliance, Mg/yr	Emission reduction, Mg/yr	Percent reduction
Continuous process vents	4,170	859	3,310	79
Batch process vents	7,090	798	6,290	89
Storage tanks	393	131	262	67
Wastewater	12,400	8,020	4,380	35
Equipment leaks	20,600	6,800	13,800	67
Total	44,700	16,600	28,000	63

TABLE 6-2. ORGANIC HAP EMISSION REDUCTIONS BY EMISSION POINT FOR EXISTING COATING MANUFACTURING SOURCES

Emission source type	Baseline emissions, Mg/yr	Emissions after compliance, Mg/yr	Emission reduction, Mg/yr	Percent reduction
Process vessels/tanks	6,677	1,630	5,047	76
Storage tanks	64	61	3	5
Wastewater	14	3	11	79
Equipment leaks	1,030	432	598	58
Transfer Operations	NA	NA	37.2	NA
Total	7,785	2,126	5,659[a]	73

[a] Excluding transfer operations.

TABLE 6-3. SECONDARY AIR IMPACTS BY EMISSION POINT FOR EXISTING CHEMICAL MANUFACTURING SOURCES

Emission source type	Increase in CO emissions, Mg/yr	Increase in NO_X emissions, Mg/yr	Increase in SO_2 emissions, Mg/yr	Increase in PM_{10} emissions, Mg/yr
Continuous process vents	119	423	276	21
Batch process vents	49	174	114	9
Storage tanks	0.1	0.2	0.5	0.01
Wastewater	14	53	15	2
Equipment leaks	0	0	0	0
Total	181	650	406	32

TABLE 6-4. SECONDARY AIR IMPACTS BY EMISSION POINT FOR EXISTING COATING MANUFACTURING SOURCES

Emission source type	Increase in CO emissions, Mg/yr	Increase in NO_X emissions, Mg/yr	Increase in SO_2 emissions, Mg/yr	Increase in PM_{10} emissions, Mg/yr
Stationary process vessels	3.19	8.75	21.5	0.54
Portable process vessels	0	0	0	0
Storage tanks	0	0	0	0
Wastewater	0.009	0.035	0.01	0.002
Transfer operations	0.002	0.005	0.01	0.0003
Equipment leaks	0	0	0	0
Total	3.2	8.8	21.5	0.54

6.2.2 Other Environmental Impacts

We do not expect implementation of the proposed standards to generate significant increases in wastewater or solid waste at any miscellaneous organic chemical production facility. We expect the adverse impact of wastewater generated by the scrubbers to be small to negligible. Secondary solid waste impacts are also expected to be minimal. At some plants, overheads from steam strippers or raw wastewater may be disposed of. Other facilities, however, may be able to recover or return materials to their processing operations as either raw material or fuel. The analysis used to generate impacts assumes the waste costs at some plants are balanced by savings at other plants.

6.3 ENERGY IMPACTS

Energy impacts include the increased electricity and raw fuel used to operate control devices required by the proposes rules. Other energy impacts are the increases in fuel needed to generate the electricity and steam that are used in various control devices.. Tables 6-5 and 6-6 present the estimated nationwide energy impacts for the miscellaneous organic chemical manufacturing and miscellaneous coating manufacturing NESHAP, respectively.

TABLE 6-5. NATIONAL ENERGY IMPACTS FOR EXISTING SOURCES IN THE CHEMICAL MANUFACTURING SOURCE CATEGORY

Emission source type	Increase in electricity consumption, 10^6 kWh/yr	Increase in fuel consumption, 10^9 Btu/yr		
		Coal to generate electricity	Natural gas used in combustion-based control devices	Natural gas to generate steam
Process vents	73	713	6,100	749
Storage tanks	0.1	1.0	0	0
Equipment leaks	0	0	0	0
Wastewater	2.9	27.8	0	745
Total	76	742	6,100	1,540

TABLE 6-6. NATIONAL ENERGY IMPACTS FOR EXISTING SOURCES IN THE COATING MANUFACTURING SOURCE CATEGORY

Emission source type	Increase in electricity consumption, 10^6 kWh/yr	Increase in fuel consumption,10^9 Btu/yr		
		Coal to generate electricity	Natural gas used in combustion-based control devices	Natural gas to generate steam
Stationary process vessels	4.0	39.4	0	0
Portable process vessels	0	0	0	0
Storage tanks	0	0	0	0
Equipment leaks	0	0	0	0
Transfer operations	0.002	0.02	0	0
Wastewater	0.0018	0.018	0	0.5
Total	4.0	39.4	0	0.5

6.4 COST AND ECONOMIC IMPACTS

Cost impacts include the capital costs of new control equipment; the cost of energy (supplemental fuel and electricity) to operate control equipment, operation and maintenance costs, the cost of monitoring associated with the proposed standards, and the cost savings generated by reducing material loss in the form of emissions. The incremental cost impacts are presented in terms of $/Mg of pollutant removed, which we determine by dividing the annual cost by the annual emission reduction. Tables 6-7 and 6-8 present the estimated capital costs, annual costs, and incremental costs for existing sources in the chemical manufacturing and coating manufacturing source categories, respectively, to comply with the proposed standards.

TABLE 6-7. SUMMARY OF COST IMPACTS FOR EXISTING SOURCES WITHIN THE CHEMICAL MANUFACTURING SOURCE CATEGORY

Emission source type	Total capital cost, $1,000	Total annual cost, $1,000/yr	Average incremental cost, $/Mg
Continuous process vents	29,200	30,700	9,300
Batch process vents	25,300	16,510	2,600
Storage tanks	6,000	2,030	7,700
Wastewater	47,200	16,900	3,900
Equipment leaks	14,100	9,320	680
Total	121,800	75,500	2,700

TABLE 6-8. SUMMARY OF COST IMPACTS FOR EXISTING SOURCES WITHIN THE COATING MANUFACTURING SOURCE CATEGORY

Emission source type	Total capital cost, $1,000/yr	Total annual cost, $1,000/yr	Average incremental cost, $/Mg
Process vessel	55,700	14,300	2,800
Storage tanks	62	12	4,900
Transfer operations	12	95	2,600
Wastewater	722	307	28,700
Equipment leaks	845	1,390	2,300
Total	57,300	16,100	2,800

Under the proposed NESHAP for miscellaneous organic chemical manufacturing, we estimate that total capital cost for existing sources would be $122 million (1999 dollars), and total annual costs would be $75.5 million per year (1999 dollars). Under the proposed NESHAP for miscellaneous coating manufacturing, we estimate that the total capital cost for existing sources would be $57 million (1999 dollars), and the total annual costs would be $16.1 million per year (1999 dollars). These figures may well overestimate the actual compliance cost impacts of the standards because of the potential to use the P2 alternative, to use common control devices, to upgrade existing control devices, and to vent emission streams into existing control devices. We could not quantify the amount by which actual compliance costs might be reduced through these means, however, because the effect of such practices is highly site-specific and data were not available to estimate how often these alternatives might be used.

6.5 REFERENCES FOR CHAPTER 6

1. Memorandum from J. Fields and D. Randall, MRI, to MON Project File. July 31, 2000. Environmental and Energy Impacts for Chemical Manufacturing Facilities.

2. Memorandum from J. Fields and D. Randall, MRI, to MON Project File. July 31, 2000. Environmental and Energy Impacts for Coating Manufacturing Facilities.